MultiAccess® ACS

Analog Communications Server

MA220

MA420

MA820

User Guide

MultiTech® Systems

MultiAccess ACS User Guide
MA220, MA420, MA820
PN S000404D Version D

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Revisions

Revision Level	*Date*	*Description*
A	08/14/06	Initial release.
B	09/26/06	Changed TCP port to 6000.
C	11/16/06	Major review.
D	07/13/07	Manual revised to include software version 1.03 and added MA220 product.

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World Headquarters

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, Minnesota 55112
Phone: 763-785-3500 or 800-328-9717
Fax: 763-785-9874

Technical Support

Country	By Email	By Phone
France:	support@multitech.fr	+(33) 1-64 61 09 81
Europe, Asia, Africa:	support@multitech.co.uk	+(44) 118 959 7774
U.S., Canada, all others:	support@multitech.com	(800) 972-2439 or (763) 785-3500

Internet Address: http://www.multitech.com

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Chapter 1 – Product Description & Specifications

Product Description

The MultiAccess ACS analog communication servers provide connectivity to the corporate LAN for telecommuters and mobile users, or to remotely installed equipment, via integrated V.92/56K modems. The MultiAccess ACS units described in this User Guide are the MA220 which is a 2-port unit; the MA420 which is a 4-port unit and the MA820which is an 8-port unit. All three units provide the same Remote Access Server, RAS, and modem sharing capabilities except for the number of ports each unit can provide. The MA420 and MA820 are provided in a desktop and rack mountable units where as the MA220 is provided in a desktop and wall mountable unit.

MultiAccess MA820

The MultiAccess ACS has two roles (usages), RAS and Modem Sharing.

RAS Solution: The MultiAccess can be used as a dial-in PPP Remote Access Server in a LAN to Client environment. The purpose is to give remote nodes (i.e., Microsoft Dail-up Networking clients) TCP/IP access to the same subnet and LAN the MultiAccess is installed on. Masquerading (NAT) and LAN to LAN routing (assignment of an entire subnet) are IP networking techniques not supported by the MultiAccess. The supported PPP security protocol (means of communicating user credentials between PPP end points) is PAP only.

Modem Sharing Solution: The modems in the MultiAccess can be a shared resource on your network, commonly referred to as a network modem pool. Computers with network access to the MultiAccess can use Telnet and get direct AT command access to one of the modems in the MultiAccess, for either outbound or inbound calls. A common way to take advantage of this role is by installing Com Port Redirector Software (i.e., Multi-Tech's MCSI2000 for Windows) on your workstations. The redirector adds a virtual com port to the workstation and uses Telnet to map, redirect, the com port to a modem in the MultiAccess. The redirector and Telnet session replaces the UART based hardware of a PC and serial cable connection normally found in traditional modem installations. A communication program using this virtual com port has its data redirected to and from the modem within the MultiAccess, making the modem appear as if it is directly attached to a communication port on the workstation.

MCSI2000 Utility is provided on the MultiAccess CD and a summary of the parameters are presented in Appendix E.

Modem AT Commands are presented in Appendix F.

For the latest revision of the MultiAccess User Documentation, refer to the Multi-Tech Systems, Inc. Web site: http://www.multitech.com

Key Features

- Integrated V.92/56K modems
- Supports dial-out for clients on IP networks
- Modems support V.92/56K dial-out and V.34/33.6K dial-in connections
- Client authentication provided through RADIUS® or local database
- Callback Security (local data base only)
- Connects to 10/100Base T Ethernet
- Industry-standard PPP client support
- Web server interface for system configuration and management
- Flash memory on modems and server for easy updates
- Two-year warranty

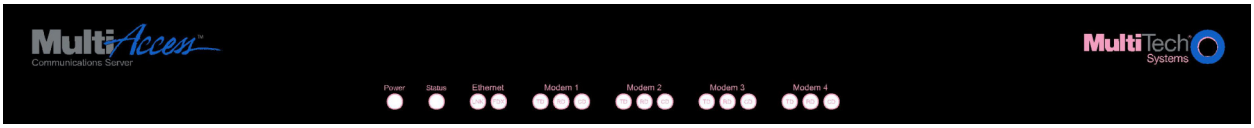
The MultiAccess package contains:

- One MultiAccess unit with factory-installed software
- One universal power supply with power cord
- Two rack mounting brackets and four mounting screws for the MA420 and MA820
  Wall mounting for the MA220
- One power cord
- One Quick Start Guide
- One product CD

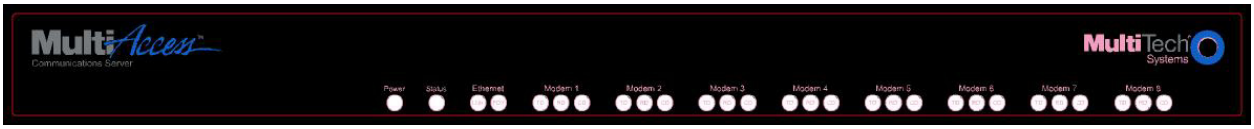
Handling Precautions

All devices must be handled with certain precautions to avoid damage due to the accumulation of static charge. Although input protection circuitry has been incorporated into the devices to minimize the effect of this static buildup, proper precautions should be taken to avoid exposure to electrostatic discharge during handling and mounting.

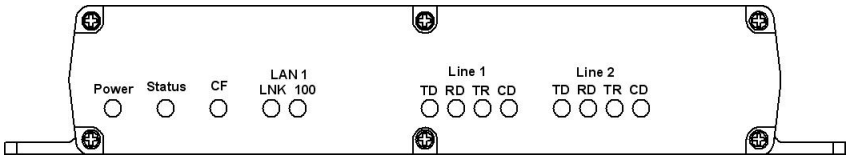
LED Indicators



MA420 Front Panel



MA820 Front Panel



MA220 Front Panel

LED	Description
Power	Lit when unit is on.
Status	Future use.
Description for Ethernet	
LNK	Link – Lit when network data connection is established. Flashes with network activity.
100	Indicates the speed of the LAN Ethernet port.
Description for Modems 1 and 2 (MA220), Modems 1 thru 4 (MA420), or Modems 1 thru 8 (MA820)	
TD	Transmit Data – Lit when data from the LAN is transmitted to the analog line.
RD	Receive Data – Lit when data recovevered from the analog line is sent to the LAN.
TR	Terminal Ready – Lit when the operating system detects and initializes the modem.
CD	Carrier Detect – Lit when a valid carrier signal is detected.

Product Specifications

Category	Description
Ethernet	RJ48 connector Interface: 10BaseT/100BaseT (UPT) Format: Ethernet 802.3, 802.2, Ethernet II or SNAP
Command port	Serial port with RJ45/RS232 connector - 115200bps, 8,N,1,No Flow Control
RJ11	Two, Four, or eight analog modems
Data Compatibility	V.92/V.90/56K, V.34/33.6, V.32bis/14.4K, V.22bis/2400 baud, V.22, V.23 & V.21; Bell 212A & Bell 103
Standards	Data: V.92, V.90, enhanced V.34 & below
	Error Correction: V.44, v.42LAPM, MNP2-4
	Data Compression: MNP® Class 5; V.42bis
Voice Compatibility	TAM (Telephone Answering Machine)
System Management	Web based - HTTP
Security	Local database or RADIUS support
Input Power	100 – 240Vac 1.2 – 0.6A 50/60Hz
Power Usage	MA420/820 Typical – 1.6W (175mA @ 9VDC) Maximum – 2.2W (225mA @ 9.9VDC) MA220 Typical – 4.05W (0.45A @ 9V) Maximum – 5.31W ((0.590A @ 9V)
Power	7W @ 5v typical (1.43A@5v) 10W @5v Max (2A@5v)
Operating Temperature	32° to +120°F (0° to 50°C); humidity range 20-90% (non-condensing)
Storage Temperature	-10°C to +85°C
Physical Dimensions	MA420/820 17.3125" w x 1.75" h x 8.375" d; 7 lbs 11 cm x 6.1 cm x 2.4 cm; 3.5K g MA220 6.4” w x 5.6” d x 1.2”h; 20.5Oz 16.3cm x 42.2cm x 3.0cm; 750g
Approvals	**Safety Certifications** UL1950 cUL60950 CSA950 AS3260 CCC **Safety Certifications for HV Builds** EN60601 **EMC Approvals** FCC Part 15 (Class A), Canada (Class A) Canadian EMC EN 55022: 1998 Class A EN 55024: 1998

Chapter 2 – Installation

The MultiAccess model MA220 is designed to install either on a desktop or a flat surface. The mounting of the MA220 is defined in the MA220 Mechanical Mounting (Optional) section in this chapter.

The MultiAccess models MA420 and MA820 are designed to install either on a desktop or in a standard EIA 19“ rack, and is shipped with the mounting hardware to install the MultiAccess in the rack. If installing in a rack, use the provided mounting hardware and follow the rack enclosure manufacturer’s instructions to safely and securely mount the MultiAccess in the rack enclosure. Proceed to the cabling procedure.

Safety Warnings

- Use this product only with UL- and CUL-listed computers.
- Never install phone wiring during a lightning storm.
- Never install a phone jack in a wet location unless the jack is specifically designed for wet locations.
- Never touch uninsulated phone wires or terminals unless the phone line has been disconnected at the network interface.
- Use caution when installing or modifying phone lines.
- Avoid using a phone during an electrical storm; there is a risk of electrical shock from lightning.
- Do not use a phone in the vicinity of a gas leak.
- To reduce the risk of fire, use only 26 AWG or larger telephone line cord.
- Disconnect this product from its power supply and telephone network interface when servicing.

Caution: Danger of explosion if battery is incorrectly replaced. A lithium battery on the MultiAccess PC board provides backup power for the time-keeping capability. The battery has an estimated life expectancy of ten years. Contact Multi-Tech if you suspect a failed battery. If data and time are incorrect after having the unit powered off, it may be due to a weak battery or incorrect setup.

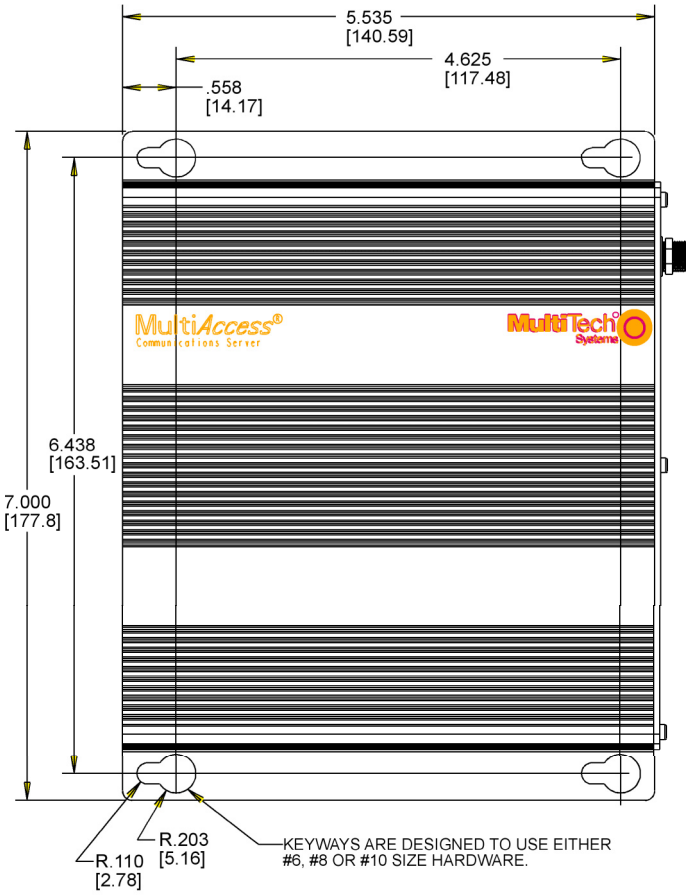
Caution: The Ethernet ports are not designed to be connected to a Public Telecommunication Network.

Safety Recommendations for Rack Instructions

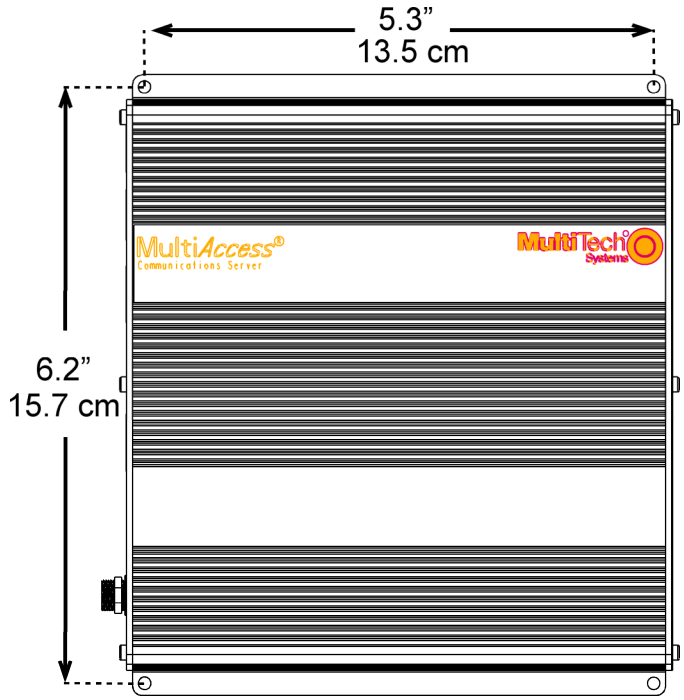
- Ensure proper installation of the MultiAccess in a closed or multi-unit enclosure by following the recommended installation as defined by the enclosure manufacturer. Do not place the MultiAccess directly on top of other equipment or place other equipment directly on top of the MultiAccess.
- When mounting the euipment in a rack, make sure mechanical loading is even to avoid a hazardous condition, such as loading heavy equipment in the rack unevenly. The rack should safely support the combined weight of all equipment it supports.
- If installing the MultiAccess in a closed or multi-unit enclosure, ensure adequate airflow within the rack so that the maximum recommended ambient temperature is not exceeded.
- Ensure that the MultiAccess is properly connected to earth ground via a grounded power cord. If a power strip is used, ensure that the power strip provides adequate grounding of the attached apparatus.
- Ensure that the mains supply circuit is capable of handling the load of the MultiAccess. Refer to the power label on the equipment for load requirements.
- Maximum ambient temperature for the MultiAccess is 60 degrees Celsius (140° F).
- This equipment should only be installed by properly qualified service personnel.
- Only connect like circuits. In other words, connect SELV (Secondary Extra Low Voltage) circuits to SELV circuits and TN (Telecommunications Network) circuits to TN circuits.

Mechanical Mounting (Optional)

The MA220 comes with chassis screw holes to facilitate attaching it to a flat surface.



Version 2

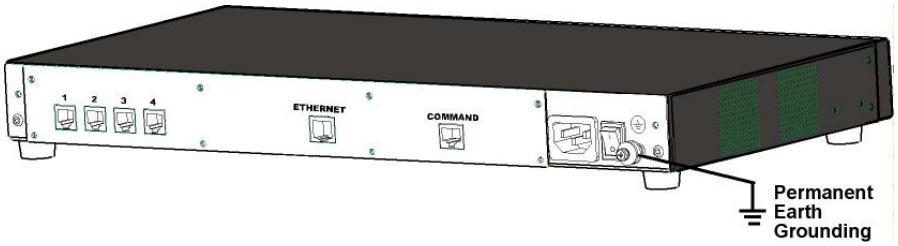


Version 1

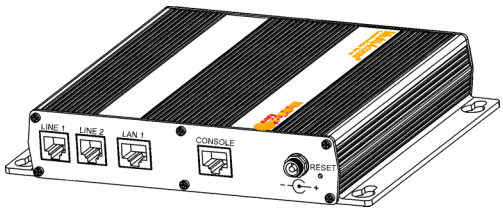
Cabling Procedure - Back Panel

Cabling your MultiAccess involves making the proper power, phone, and ethernet connections as described and illustrated below.

The MultiAccess MA420 and MA820 back panels have a fan, a power plug, **POWER** Switch (**| / O**), four or eight RJ-11 phone jacks, an **Ethernet** jack, and a **Command** jack. The MA220 back panel has two **LINE** RJ-11 phone jacks, an Ethernet, **LAN 1**, and a **CONSOLE** jack.



Back Panel - MA420



Back Panel – MA220

1. Plug one end of your RJ45 Ethernet cable into the **Ethernet** (MA420 & MA820) or **LAN 1 (**MA220) jack on the back of the MultiAccess and the other end to the hub on your local network.

   Caution: Before connecting to the Ethernet network, make sure that the network to which you are connecting the MultiAccess is not a 192.168.2.x subnet. Because the MultiAccess's factory default IP address is 192.168.2.1, connecting it to a network that has a different device at the same IP address would cause data interference.

   If it is a 192.168.2.x subnet, connect from the Administrative PC to the MultiAccess using an RJ45 crossover cable until the MultiAccess's IP address has been configured. Afterwards, connect the MultiAccess into the network with an ordinary RJ45 cable.
2. Using a standard telephone cable, connect one end of the cable to the first RJ11 jack (1 or Line 1) on the back of the MultiAccess and the other end to one of your phone jacks.
3. Continue to connect standard telephone cables to the remaining RJ11 jacks on the back of the MultiAccess.
4 The **Command** or **CONSOLE** jack is only to be used with direction from Multi-Tech's Technical Support Personnel.
5. For the MA420 and MA820, ensure that the MultiAccess is securely and permanently connected to an earth ground (GND) with a ground wire of 18 gauge (18 AWG) or thicker. The ground wire needs to be installed between the grounding screw on the MultiAccess and a permanent earth ground.

   Whether the MultiAccess is used in a rack or desktop, you must verify that the earth ground connection is permanent and reliable. In order for the earth ground to be considered permanent, the grounding wire must connect to the earth ground of the building's electrical wiring system and the ground connection must use a screw terminal or other reliable means of fastening. The ground connection must not be as easily disconnected as, for example, a power cord.
6. On the MA220 unit, secure the power lead from the power source and then connect the power source to a live power outlet.

   On the MA420 and MA820 units, with the Power switch in the off (**O**) position and using the supplied power cord, connect the MultiAccess power plug to a live power outlet.
7. Place the MultiAccess Power switch to the on (|) position for the MA420 and MA820 to turn on the MultiAccess.
8. Proceed to Configuring Your MultiAccess.

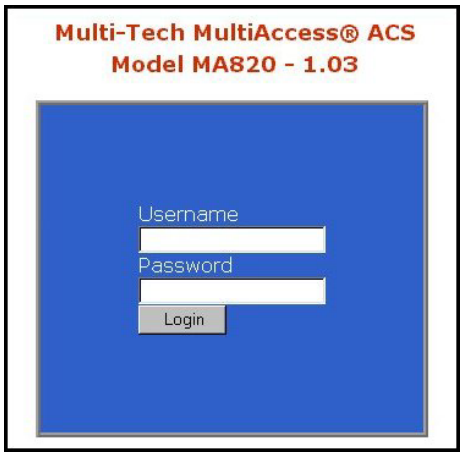
Chapter 3 – Configuring Your MultiAccess

Setting Admin PC to Startup IP Address

1. Connect a PC to your network. Record the PC's current IP address before you change it.
2. Set the PC IP address to **192.168.2.x** subnet (using any address excluding 192.168.2.1).

Logging In

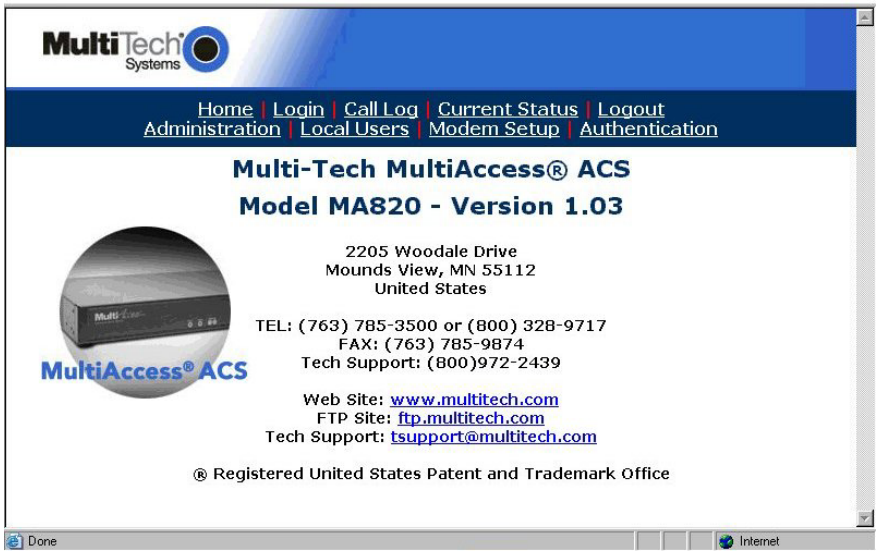
1. Bring up a Web browser on your PC. At the browser's address line, type the default address of the MultiAccess: **http://192.168.2.1** and press **Enter**.
2. The **Login** screen will appear.



At this point you can be assured that the MultiAccess is connected to the network.

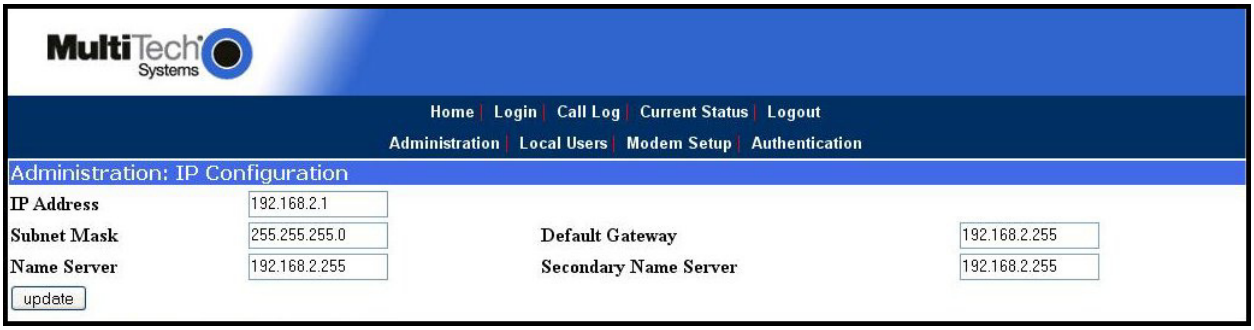
If the **Login** screen does not appear, see item #1, "What if I can't see the web page for my MultiAccess?" in *Chapter 5:* ***Troubleshooting***.

3. At the **Login** screen, enter **admin** (all lower case) in the Username field.
4. Enter **admin** (all lower case) in the Password field.
5. Click the **Login** button. The **Home** screen will appear. From this screen, you can access all of the MultiAccess software screens.


MultiTech Systems
Home | Login | Call Log | Current Status | Logout
Administration | Local Users | Modem Setup | Authentication
Multi-Tech MultiAccess® ACS
Model MA820 - Version 1.03
MultiAccess® ACS
2205 Woodale Drive
Mounds View, MN 55112
United States
TEL: (763) 785-3500 or (800) 328-9717
FAX: (763) 785-9874
Tech Support: (800)972-2439
Web Site: www.multitech.com
FTP Site: ftp.multitech.com
Tech Support: tsupport@multitech.com
® Registered United States Patent and Trademark Office
Done
Internet

Setting MultiAccess IP Addresses

1. In the MultiAccess **Administration** screen, go to the **IP Configuration** fields.



2. Fill in the IP information that applies to your MultiAccess unit. The fields for “IP Address,” “Subnet Mask,” “Default Gateway” and “Name Server” are required. A “Secondary Name Server” is optional.

3. Click **Update**. After the **Update** button has been clicked, it takes 5 seconds for the page to update.

Resetting Admin PC to Its Original IP Address

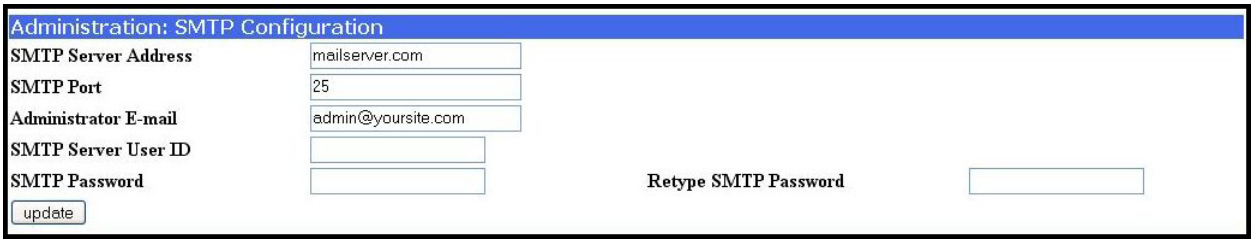
In Setting the Admin PC to the network number of the MultiAccess, you recorded the original IP address of the administrator’s PC and then reset it to the IP address required to allow communication with the MultiAccess unit. You may now set the IP address of the administrator’s PC back to its original value or to any other value that will allow you to communicate with the MultiAccess at its new IP address.

Logging In Again

Having reset the IP address of the administrator’s PC, you must log into the MultiAccess software again with the new IP address. Go to the **Login** screen, enter **admin** as User Name and **admin** as Password.

Setting Up the Mail Server

1. From the Administration screen, go to the SMTP Configuration fields.

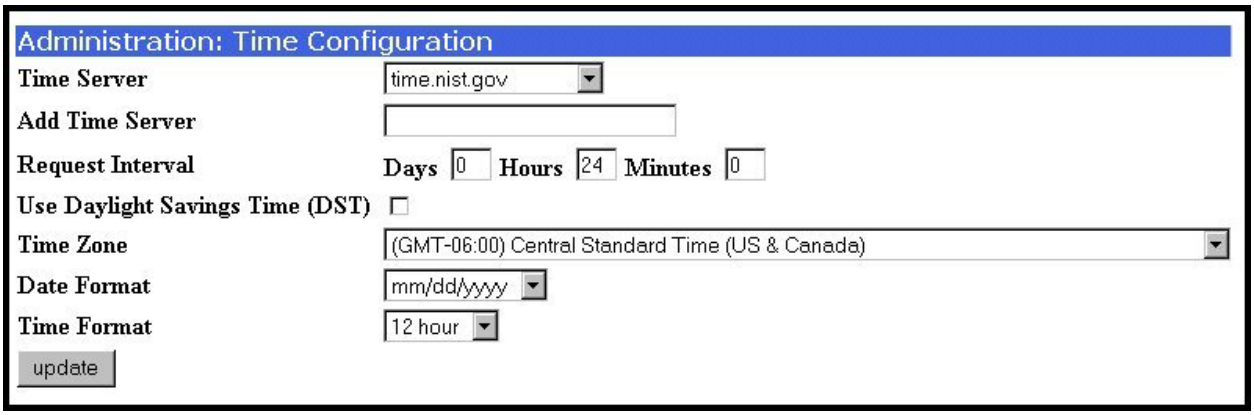


1. Enter the mail server address in the **SMTP Server Address** window (e.g., mail.multitech.com or IP address).
2. The default **SMTP Port** number is 25.
3. Enter the E-mail address of the administrator in the **Administrator E-mail** window.
4. If the SMTP Server requires an User ID, enter the ID in the **SMTP Server User ID** window.
5. If the SMTP Server requires a password, enter the password in the **SMTP Password** window.
6. If you enter a password, retype the identical password in the **Retype SMTP Password** window.

Click on **Update**. At this point the MultiAccess will send the Administrator an email saying that the mail server address has been updated.

Time Configuration

1. In the MultiAccess **Administration** screen, go to the **Time Configuration** fields.



2. In the **Time Server** window, select from the three time server URLs. The default is time.nist.gov. The Time Server is a substitute for a real-time clock in the MultiAccess.

   If you would like to add your own time server, you can enter the URL or IP address of your time server in the **Add Time Server** window.

3. In the **Request Interval** window, select the **Days, Hours,** and **Minutes** that the MultiAccess will update its clock from the time server.

4. If you are in daylight savings time, check the **Use Daylight Savings Time (DST)** box.

5. In the **Time Zone, Date Format,** and **Time Format** windows, choose the options for your time zone.

6. Click the **update** button to change to your new parameters.

Modem Configuration

There are two primary ways to use the modems; RAS and Modem Sharing. Prior to software release version 1.03, the ports were configured for either RAS or modem sharing, for which they were then dedicated to just that role. Now, with software release version 1.03, both roles are automatically enabled, alleviating the need for administrator intervention when either role is desired.

The Modem Configuration fields allow you to define the parameters per port. The number of ports shown depends on the specific model of MultiAccess, POTS modem 1 and 2 for the MA220, POTS modem 1 thru 4 if the model is the MA420 or POTS modem 1 thru 8 if the model is the MA820.

The TCP port, socket, number used by Telnet to access the modem is dependent on how the Modem Sharing Pool option is used. If this option is set to “pool”, port 6000 is used. All POTS modem ports set to pool, 6000, must have the same exact Modem Sharing option, with or without authentication, etc. When a Telnet client on the LAN opens a connection to 6000, it is given the lowest number POTS modem port that is not in use.

If the Modem Sharing Pool option is set to “non-pool”, then a specific 7000+ number is sequentially associated to each POTS modem, POTS modem 1 is assigned 7000, POTS modem 2 is assigned 7001 and so on incrementally through POTS modem 8 with 7007 for a MA820 unit.

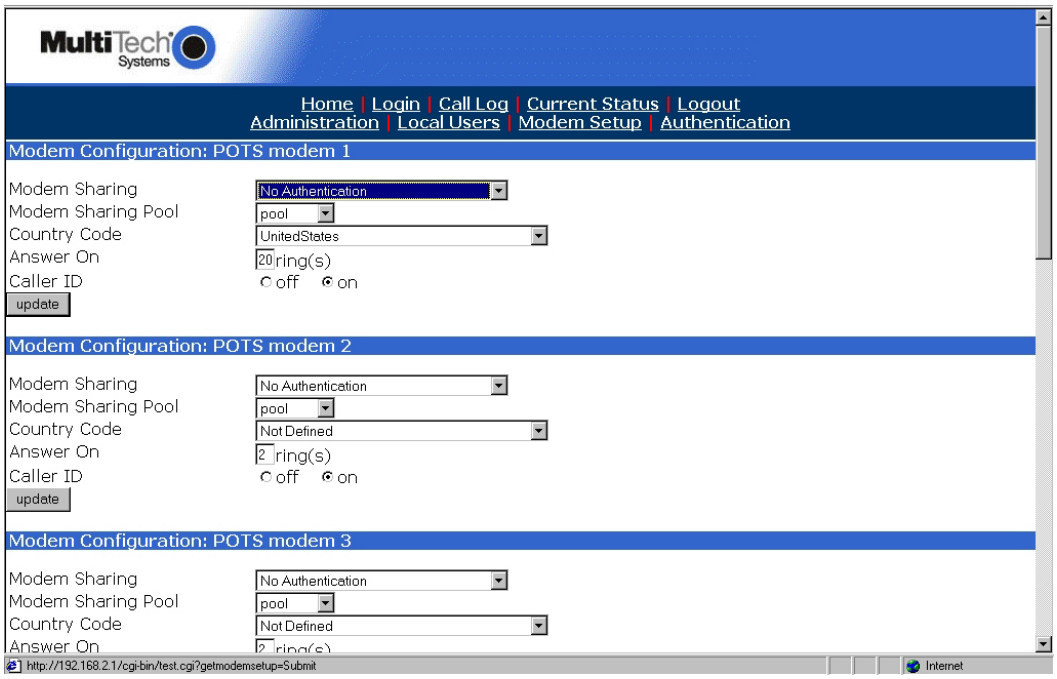
Modem Sharing with authentication means a login prompt will be issued to the socket when it is opened. Who (what) ever opened the socket must provide appropriate credentials before access is given to the modem. When access is granted to the modem, an “OK” response message will be issued.

When Modem Sharing with Radius Authentication is selected, the Radius server that will be used is defined in the Authentication menu.

When Modem Sharing with Local Authentication is selected, credentials (users) shown in the Local Users menu are to be used.

When Modem Sharing with RAW is selected – support for RFC 2217 (com port control via Telnet) will be disabled.

1. Select the desired **Modem Sharing** option by clicking on the down arrow and highlighting your authentication.



No Authentication. Immediate access is given to the modem.

Local Authentication. A valid set of credentials, defined in the Local User data base, is required before access is granted.

Radius Authentication. A valid set of credentials, defined in the Radius User data base, is required before access is granted. The Radius Server is defied in the Authentication menu.

Raw Mode with No Authentication. User data is treated “as is”, without interpretation, and no authentication is required.

Raw Mode with Local Authentication. User data is treated “as is”, without interpretation, and a valid set of credentials, defined in the Local User data base, is required before access is granted.

Raw Mode with Radius Authentication. User data is treated “as is”, without interpretation, and a set of credentials, defined in the Radius User data base, is required before access is granted.

2. If **Modem Sharing Pool** is set to **pool**, port 6000 is used. ***All POTS modem ports set for pool must have the same exact Modem Sharing option.***

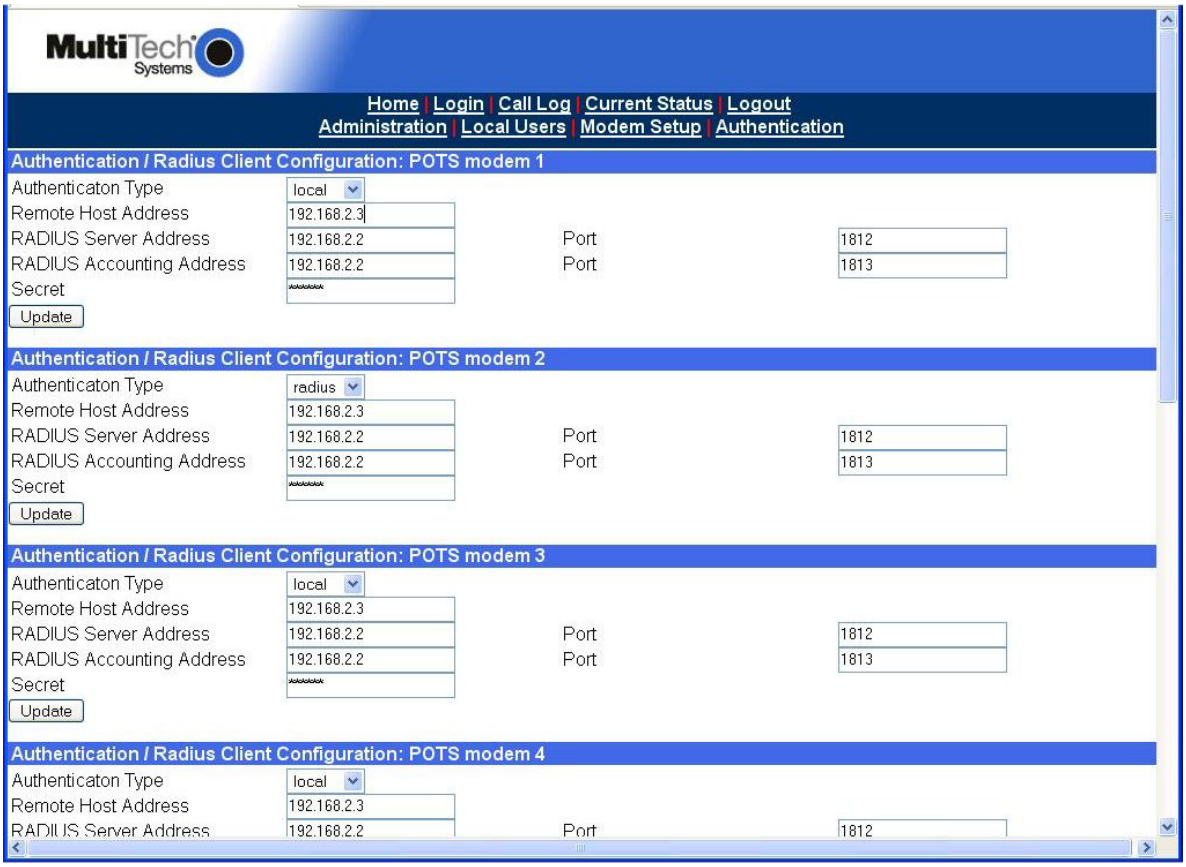
   If **Modem Sharing Pool** is set to **non-pool**, port 7000 is assigned to the POTS modem 1 port.
3. Select your **Country Code** by clicking on the down arrow and choose your country/region.
4. If the modem is being used for in-bound calls, select the number of **ring(s)** for **auto answer**.
5. If calls are in-bound, click the **on** option for the **Caller ID**.
6. Click **Update**.
7. Repeat the above procedure for each POTS modem 2 on the MA220, POTS modems 2 thru 4 on the MA420 or POTS modems 2 thru 8 for the MA820.

Setting Authentication

The Authentication menu displays two ports for the MA220, four ports for the model MA420 or eight ports for the model MA820. The ***Authentication/Radius Client Configuration:POTS modem X*** fields allow you to select and define certain user authentication details on a per port basis.

The Authentication Type option, on this menu, applies only to RAS, PPP, calls.

Please Note: When Modem Sharing, in Modem Setup, is configured to implement Radius Authentication it will use the RADIUS Client details defined here to authenticate the user, regardless of how the Authentication Type option on this menu is set.


MultiTech Systems
Home | Login | Call Log | Current Status | Logout
Administration | Local Users | Modem Setup | Authentication
Authentication / Radius Client Configuration: POTS modem 1
Authenticaton Type local
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812
RADIUS Accounting Address 192.168.2.2 Port 1813
Secret
Update
Authentication / Radius Client Configuration: POTS modem 2
Authenticaton Type radius
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812
RADIUS Accounting Address 192.168.2.2 Port 1813
Secret
Update
Authentication / Radius Client Configuration: POTS modem 3
Authenticaton Type local
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812
RADIUS Accounting Address 192.168.2.2 Port 1813
Secret
Update
Authentication / Radius Client Configuration: POTS modem 4
Authenticaton Type local
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812

When the authentication method is local, use the Local User menu to build a Database of user credentials. The MultiAccess matches the credentials provided by the caller with the credentials listed in the Local User Database. Additionally, local users can be configured for PPP call back.

When the Authentication Type is Radius, the MultiAccess sends the credentials provided by the caller to the Radius Server for authorization.

For RAS calls, dial-in PPP, a second static IP address is needed in the Remote Host Address field. This address is for the dial-in user, PPP peer. This address needs to be on the same subnet, network number, as that of the MultiAccess.

When the authentication method is Radius, then the IP address and UDP port of the Radius Server and Radius Accounting Server have to be entered and the Secret has to be entered.

Radius accounting begins after successful Radius authentication. Radius accounting summarizes the time and date, duration, POTS port connected and the IP address given to the user for the call. Radius accounting does not track the amount or type of data of the session or the places the user communicates with.

The Secret is an MD5 encryption key used by both the Radius Server and Radius Client, MultiAccess. It must be the same alphanumeric string, including case that is defined in the Radius Sever.

Authentication / Radius Client Configuration: POTS modem x

1. In the Authentication Type, if your database for user credentials resides in the Local User Database on the MultiAccess, then accept the default – **local**.

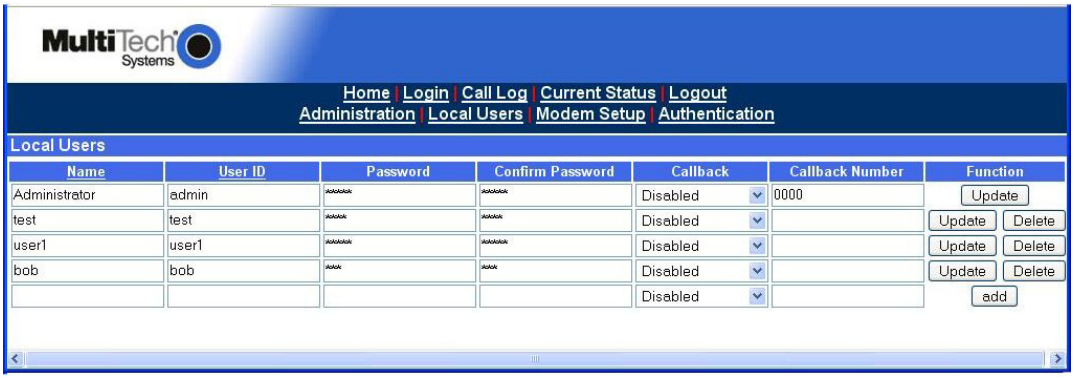
   If your user database resides on a Radius Server, then click on the **down arrow** and choose **radius**.
2. For RAS calls, enter an available IP address from your existing network scheme in the **Remote Host Address** window which will be assigned to the dial-in user. This Remote Host Address has to match the network number of the MultiAccess.
3. If you are setting up MultiAccess to use Radius authentication, then enter the IP address of the RADIUS Server in the **RADIUS Server Address** window.
4. Enter the **port** number (usually port 1812) for the RADIUS Server in the top Port window. The Radius Server has to be listening on the same UDP port that the Radius Client, MultiAccess, is using.
5. Enter the IP address of the RADIUS Accounting server in the **RADIUS Accounting Address** window.
6. Enter the **port** number (usually port 1813) for the RADIUS Accounting server in the bottom Port window. The Radius Accounting Server has to be listening on the same UDP port that the Radius Client, MultiAccess, is using.
7. Enter the **Secret** of the RADIUS Server that you are communicating with. The Secret has to be identical to the one used by your RADIUS Server and is limited to 14 alphanumeric characters.
8. Click on the **Update** button to save your port configuration.
9. Repeat the above procedure for POTS mdoem 2 on the MA220, POTS modems 2 thru 4 for the MA420, or if MA820 for POTS modems 2 thru 8.

Setting Up Local Users

The administrator builds the Local Users data base by defining the Name field, recording the User ID, Password entries, and callback method. The administrator account has both administration of the MultiAccess and dial-in rights and dial-out rights. The local user accounts have dial-in and dial-out rights. Remote users enter their user ID and password at the beginning of the dial-in session.

For Local Authentication, go to the **Local Users** screen.

Note: The first row is for the "Administrator" function. No matter what values are used for the **Name**, **User ID** and **Password** fields, the first row will still apply to the person doing the Administrator function for the MultiAccess. The Administrator is the party privileged to configure the MultiAccess.



Note: Callback Security can be implemented in two ways: 1) a fixed telephone number by choosing Admin specific in the Callback window. 2) A variable telephone number by choosing User specified in the Callback window.

Administator Row:

1. In the "Administrator" row of the **Local Users** screen, enter the Name and User ID to be used for the MultiAccess administrator (it need not be literally "Administrator").
2. In the Password window, enter an alphanumeric password. Passwords can be as long as 21 characters and are case-sensitive.
3. In the Confirm Password window, enter the identical alphanumeric password.
4. If the administrator is going to use the Callback Security option, click on the **Callback** down arrow and choose the callback method. The fixed phone number is **Admin specified** or variable phone number is **User specified**.

   If the **Callback Security** option is enabled and **Admin specified** is selected, then enter your fixed callback telephone number in the **Callback Number** window.

   If the **Callback Security** is enabled and **User Specified** is selected, you **do not** enter a telephone number in the **Callback Number** window. You enter the callback telephone number during the dial-in process.
5. Click on **Update** in the "Administrator" row. At this point, a **Login** screen will appear and you will be asked to log in again. Log in using the administrator's User ID (as listed in the "User ID" column) and the administrator's current password.

   Caution: If you change the admin password, you must be sure you remember your new password.

Users Row:

1. In the first blank row, enter the **Name** and **User ID** of your local user.
2. In the **Password** window, enter an alphanumeric password. Passwords can be as long as 21 characters and are case-sensitive.
3. In the **Confirm Password** window, enter the identical alphanumeric password.
4. If you are going to enable the Callback Security option for a remote user, click on the **Callback** down arrow and choose the callback method. A fixed phone number is **Admin specified** or variable phone number is **User specified**.

   For example of a **user specified**, if a traveling sales person needs to be called back at their current location, they will provide the callback telephone number during the dial-in process. You **do not** enter a telephone number in the Callback Number window.

If the **Callback Security** option is enabled and **Admin specified** is selected, then enter their fixed callback telephone number in the **Callback Numer** window.

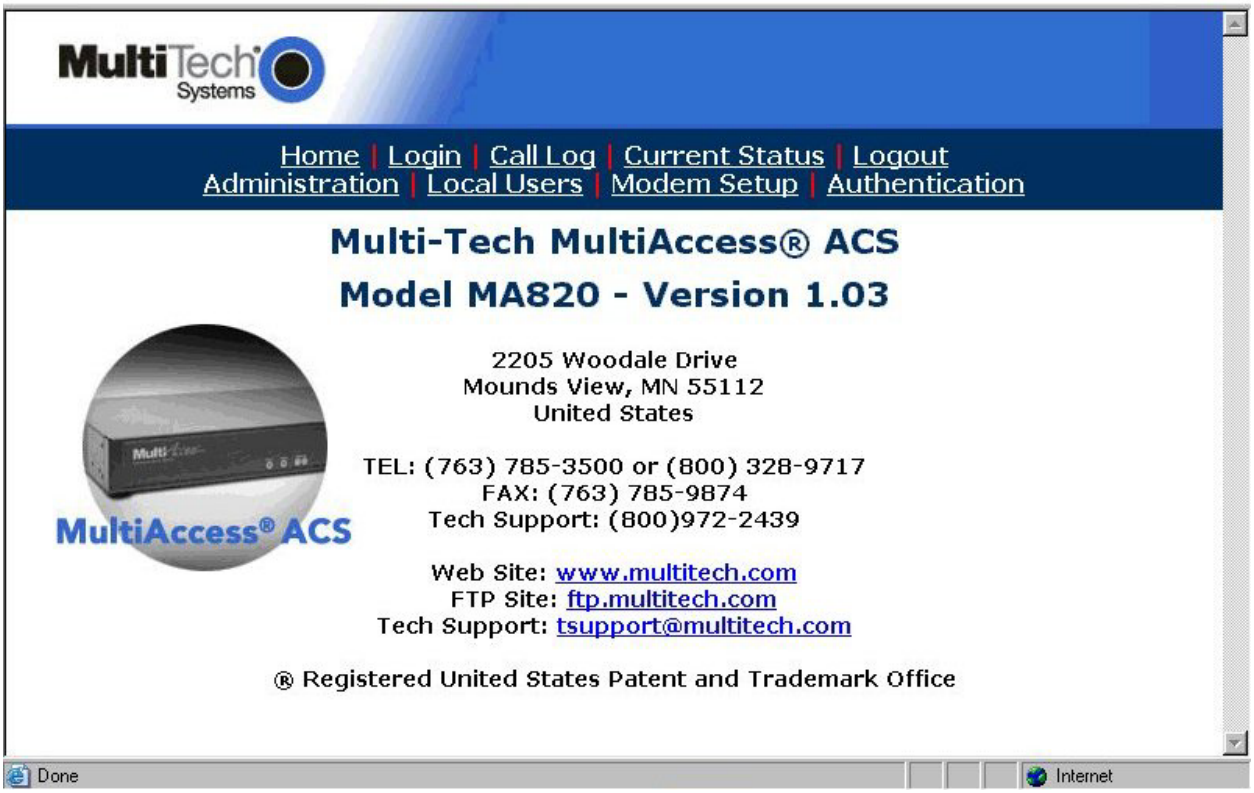
5. Click the **add** button to include this local user in the data base.
6. Repeat the Local User Row steps for each local user you want to add to your local user data base.

Chapter 4 – Software

In this chapter, we present the screens of the MultiAccess software. We describe each field in each screen and some of the command buttons. (We do not describe command buttons that have functions that would be readily understood by users of Windows software. Examples of such self-evident functions include buttons like “OK,” “Cancel,” “Next,” etc.)

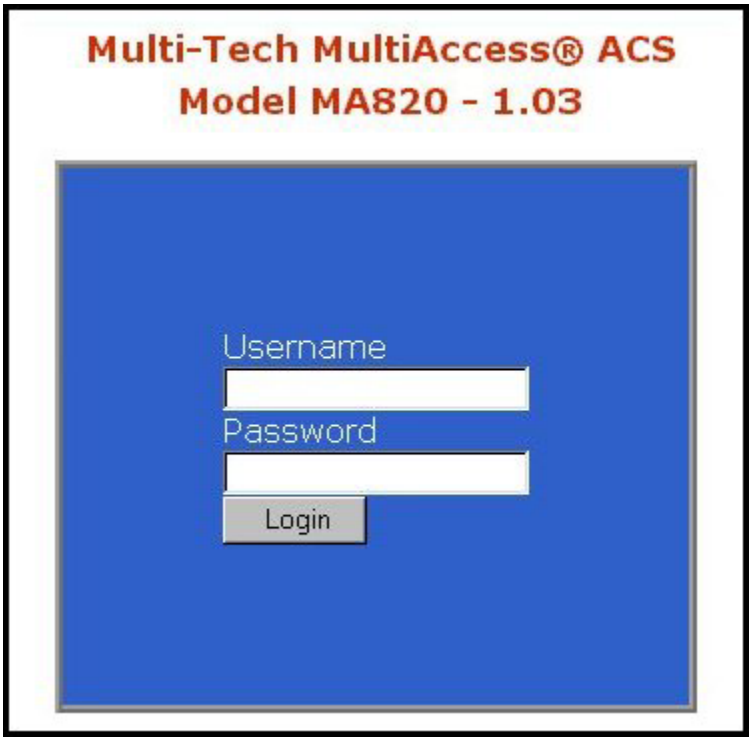
Home Screen

The MultiAccess **Home** screen offers access to all other MultiAccess software screens.


MultiTech Systems
Home | Login | Call Log | Current Status | Logout
Administration | Local Users | Modem Setup | Authentication
Multi-Tech MultiAccess® ACS
Model MA820 - Version 1.03
MultiAccess® ACS
2205 Woodale Drive
Mounds View, MN 55112
United States
TEL: (763) 785-3500 or (800) 328-9717
FAX: (763) 785-9874
Tech Support: (800)972-2439
Web Site: www.multitech.com
FTP Site: ftp.multitech.com
Tech Support: tsupport@multitech.com
® Registered United States Patent and Trademark Office
Done
Internet

Login Screen

The MultiAccess **Login** screen is the primary security Device for the Server software.



The MultiAccess has a default setting that allows use of “admin” as both the User Name and the Password at initial startup. After you have begun configuring your MultiAccess, you should change the password in the **Local Users** screen for the administrator account described later in this chapter.

Call Log Screen

The Call Log screen allows you to set the logging parameters and access the call history. The Log Parameters define the email log threshold and the number of entries retained in the log history. The Call Log summarizes each call and the Details button displays an indepth look at the call from the individual initiating the call, when the call was connected, duration of the call, transmit and receive baud rates, to authentication status.

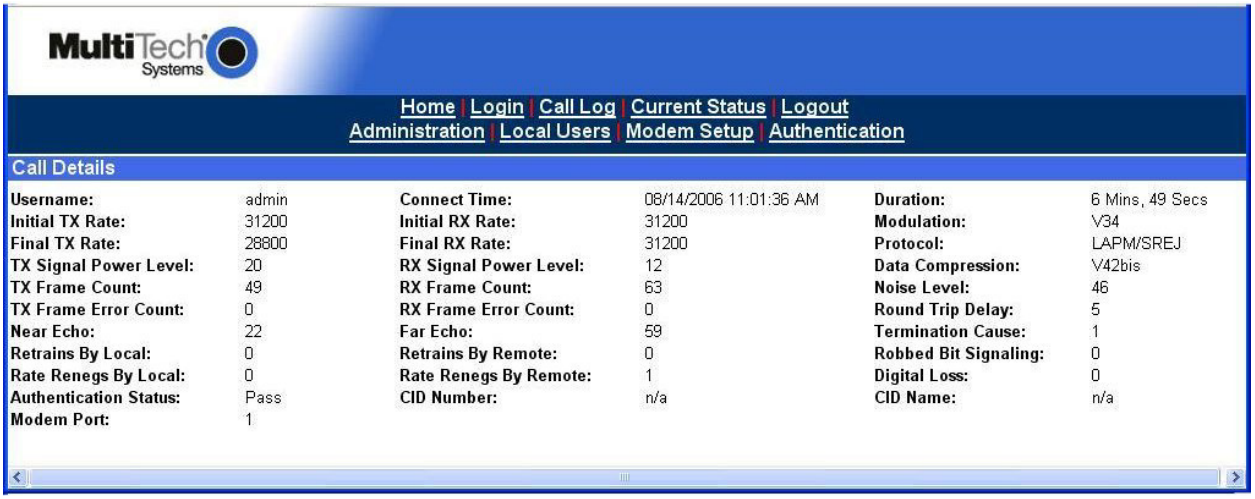
Log Parameters Field Definitions		
Column	**Values**	**Description**
Email Log Threshold	Numeric 1 to 200 entries	The Email Log Threshold is limited to 200 logs. The threshold is limited by the memory in the MultiAccess.
Log History	Numeric 1 to 200 entries	The Log History Entries defines how many Call Log entries are stored. The threshold is limited by the memory in the MultiAccess and that limit is 200 entries.
Save Changes (button)		Click the Save Changes button save the threshold and history entries.
Send Log Now (button)		Click the Send Log Now button sends an email to the administrator containing an attached text file, listing the calls (date, time, user name, duration).
Delete Log (button)		Click the Delete Log button to remove all Calls in the Log.

Call Log

Call Log Field Definitions		
Column	**Values**	**Description**
Modem	numeric	Defines modem reporting call details.
Time	mm/dd/yyyy: hh/mm/ss	Date and time that call started.
Username	alphanumeric	The name of the user generating or receiving the call.
Rate	33,600; 31,200; 28,800; 26,400; 24,000; 21,600; 19,200; 16,800; 14,400; 12,000; 9600; 7200; 4800; 2400; 1200; 0-300 bps	The modulation rate in bits per second at which the current call occurred.
CID Number	0-9,*,#	Caller's telephone number
CID Name	alphanumeric	Caller's identification name
Details (button)		The Details button displays the details of that call.

Call Details

The Call Details screen displays the details of the call when the Details button was clicked for the call displayed in the Call Log. The Call Details present an indepth view of the call from the individual initiating the call to the time it was connected, duration of the call, transmit and receive baud rates, authentication status, and much more.


MultiTech Systems
Home | Login | Call Log | Current Status | Logout
Administration | Local Users | Modem Setup | Authentication
Call Details
Username: admin
Initial TX Rate: 31200
Final TX Rate: 28800
TX Signal Power Level: 20
TX Frame Count: 49
TX Frame Error Count: 0
Near Echo: 22
Retrains By Local: 0
Rate Renegs By Local: 0
Authentication Status: Pass
Modem Port: 1
Connect Time: 08/14/2006 11:01:36 AM
Initial RX Rate: 31200
Final RX Rate: 31200
RX Signal Power Level: 12
RX Frame Count: 63
RX Frame Error Count: 0
Far Echo: 59
Retrains By Remote: 0
Rate Renegs By Remote: 1
CID Number: n/a
Duration: 6 Mins, 49 Secs
Modulation: V34
Protocol: LAPM/SREJ
Data Compression: V42bis
Noise Level: 46
Round Trip Delay: 5
Termination Cause: 1
Robbed Bit Signaling: 0
Digital Loss: 0
CID Name: n/a

Current Status Screen

The Current Status screen provides the administrator a system summary and the ability to place POTS modem ports in and out of service. The system summary displays the current time and date of the MultiAccess unit, the status of e-mail notifications, and the status of SNTP communication. The Make Busy button will place an idle port out of service by taking the modem off hook at the phone line. The Initialize Modem button is used to clear the busy condifiton, by putting the modem on-hook. These buttons have no affect while the modem is connected.

MultiTech Systems
Home | Login | Call Log | Current Status | Logout
Administration | Local Users | Modem Setup | Authentication
Current Status: System
Current Time 08/14/2006 11:05:37 AM
Up Time 12 minutes
Pending Messages 0
Email Status No Errors
Email To: calmquist@multitech.com
Subject: ACS: (192.168.4.242) is online - version 1.00
Time Server Status No Errors
Current Status: POTS modem 1
State Connected
Username admin
Connect Time 08/14/2006 11:01:36 AM
Elapsed Time 4 Mins, 1 Sec
Version LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
Initialize Modem
Make Busy
Current Status: POTS modem 2
State Waiting For Ring
Username
Connect Time
Elapsed Time
Version LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
Initialize Modem
Make Busy
Current Status: POTS modem 3
State Waiting For Ring
Username
Connect Time
Elapsed Time
Version LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
Initialize Modem
Make Busy
Current Status: POTS modem 4
State Waiting For Ring
Username
Connect Time
Elapsed Time
Version LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
Initialize Modem
Make Busy

Current Status Field Definitions		
Field Name	**Values**	**Description**
System group		
Current Time	mm/dd/yyyy: hh/mm/ss	The present date and time of day.
Pending Messages	numeric	Emails for the administrator that have not been sent. These can include debug log messages, and mail server change notifiction message (relating to the “SMTP Server Address” field of **Administration** screen).
Email To:	Alphanumeric in email name format	Displays the administrator’s e-mail address.
Subject:	Alphanumeric	Title of the last sent email.
Time Server Status	Initializing, No Errors, SNTP Error: *type*	Display’s the current state of the communication status between the MultiAccess and the Time Server.

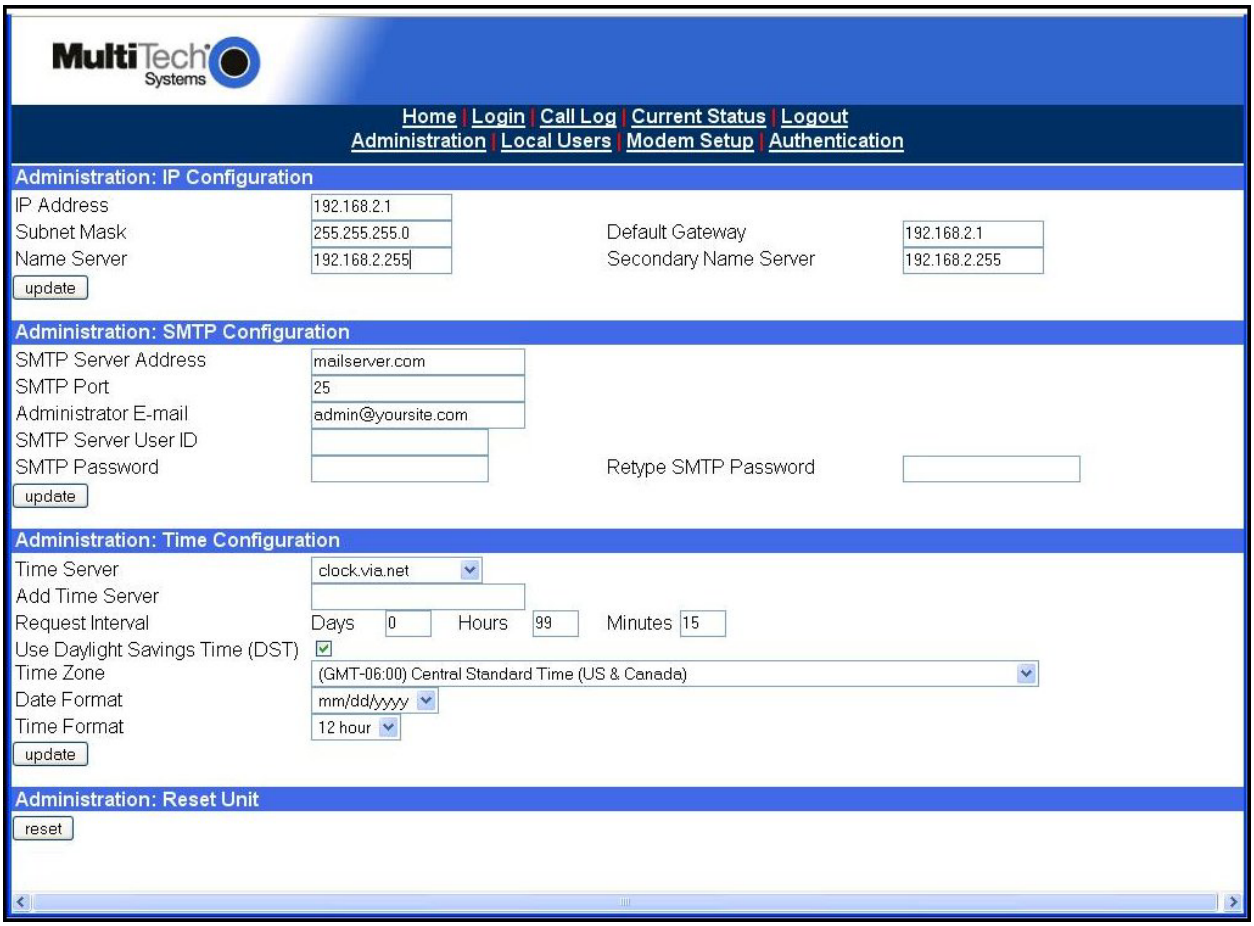
Current Status Field Definitions (cont'd)		
Field Name	**Values**	**Description**
System group		
Up Time	*x* days *yy* hours: *zz* minutes	Operation time since last reboot.
Email Status	No Errors, Bad MailServer Address, Mail Server Connect Failed, SMTP Invalid Response, SMTP Client Timeout	Indicates whether the MultiAccess's admin emails proceed without error.
POTS Modem X group		
State	Waiting for Ring, Initializing Modem, Waiting for Connect, User login getting Call info	Indicates the modem's current operating condition.
Connect Time	mm/dd/yyyy, hh:mm:ss	For the current call, the date and time at which the connection began.
Username	alphanumeric	The name of the user if the modem is connected.
Elapsed Time	numeric	The duration of the current call in seconds.
Initialize Modem (button)		Initializes the modem, clearing a busied-out state.
Make Busy (button)		Imposes a busied state on the modem.

Logout Option

When you click on Logout in the **Home** screen, you will be logged out of the MultiAccess software. The **Login** screen will appear to allow access to re-enter the program.

Administration Screen

The Administration Screen sets up the network addressing of the MultiAccess, communication with the SMTP mail server, and defines the SNTP time server for the MultiAccess.

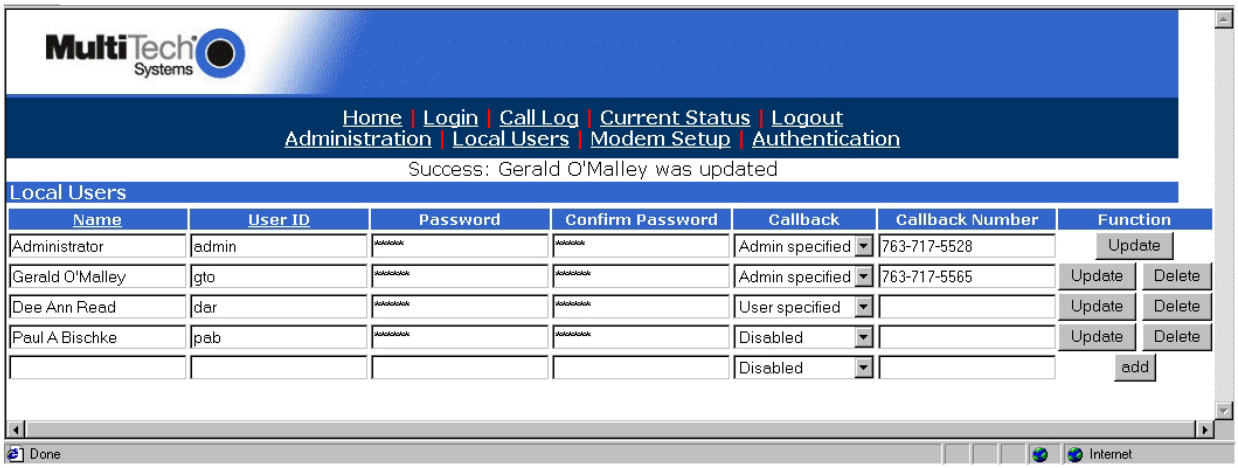


Administration Screen Field Definitions		
Field Name	**Values**	**Description**
IP Configuration Fields		
IP Address	n.n.n.n	The IP address of the MultiAccess.
Subnet Mask	n.n.n.n	The subnet mask is used to identify the two parts of the IP address; network number and host number. A subnet mask is used in conjunction with the IP address to determine if a data destination is on the same immediate network or not. The default value is 255.255.255.0.
Name Server	n.n.n.n	The IP address of your DNS server.
Default Gateway	n.n.n.n	Address used to route IP packets off the immediate network.
Secondary Name Server	n.n.n.n	The IP address of a backup DNS server, optional.
Update (button)		Click on this button to make changes to IP Configuration fields take effect.

Administration Screen Field Definitions		
Field Name	**Values**	**Description**
SMTP Configuration Fields		
SMTP Server Address	URL or IP address	Domain name or IP address for mail server (SMTP must be supported on mail server).
SMTP Port	Numeric	The default SMTP Port number is 25.
Administrator E-mail	Alphanumeric in email name format	The administrator's email address. This address has to be entered in proper user@domain format. Reasons for sending an e-mail; MultiAccess is on-line, call logs full, administrator's e-mail address is changed.
SMTP Server User ID	Alphanumeric	An additional security identifier for the mail server, that if required by the mail server is typically a short unique name or location of the server.
SMTP Password	Alphanumeric	Security code for the SMTP Server.
Retype SMTP Password	Alphanumeric	After the SMTP Password is entered above, an exactly matching entry must be made here to validate that password
Update (button)		Click on this button after changes have been made to the SMTP Server's configuration before the change take effect.
Time Configuration Fields		
Time Server	URL or IP address	Location of time-tracking computer that supports SNTP. This server is the functional substitute for a real-time clock in the MultiAccess. It will contact this server 5 times in 20 seconds. If contact fails, it will try 5 times again 5 minutes later. If contact succeeds, the MultiAccess will update its clock periodically per an interval set in the Request Interval option.
Add Time Server	URL or IP address	Used to add a user-supplied time server.
Request Interval	xx days, yy hours, zz minutes	This value (to be set by user) indicates how often the MultiAccess will update its clock from the Time Server.
Use Daylight Savings Time	Check box	New 2007 dates. Start DST second Sunday in April. End first Sunday in Nov.
Time Zone	Pull-down listing	Indicates the time zone in which the MultiAccess is located.
Date Format	Numeric	Click on the down arrow to select the date format.
Time Format	Alphanumeric	Click on the down arrow to select the time format.
Update (button)		Click on this button to make changes to Time Configuration settings take effect.
Reset (button)		Soft reboot of MultiAccess.

Local Users Data Base Screen

The Local Users menu is used to build an internal user data base when Modem Sharing with Local Authentication, in the Modem Setup menu, is selected and/or when the Authentication Type is set to local in the Authentication menu. The administrator builds the data base by creating a record for each user. A user record contains; Name, User ID, Password, and callback elements. The administrator account has both administration of the MultiAccess and dial-in and dial-out rights. The user accounts have dial-in and dial-out rights. The remote user enters their User ID and password at the beginning of the dial-in session.



Local Users Field Definitions		
Field Name	**Values**	**Description**
Name	21 alphanumeric characters max	The Name field is an unique identifier that is used for ease of administration and is not used for authentication. For each user entry, this column shows the user's name as you entered it.
User ID	21 alphanumeric characters max	The administrator enters the user ID that the remote user is going to enter at his/her login prompt.
Password	21 alphanumeric characters max	The administrator enters the password that the remote user is going to enter at his/her login prompt.
Confirm Password	21Alphanumeric Characters max	The confirm password is the identical password that you just entered in the Password window.
Callback	Disabled, User specified, Admin specified	This option defines the callback methodolgy; disabled, User specified or Admin specified. User specified allows a remote user to enter a callback telephone number from the location they are currently at. Admin specified allows a fixed telephone number to be entered that is associated with a permanent remote location.
Callback Number	Numeric and standard dial modifiers	You define this only when Admin specified is selected in the Callback option. This is the telephone number that the MultiAccess uses to call the remote user. This telephone number can be up to 39 digits.
Function – Update (button)		Click the Update button after you have changed a user's record.
Function – Delete (button)		Click the Delete button to remove a user record.
Function – Add (button)		Click the Add button when you have entered a new user into the Local Users data base.

Modem Setup Screen

The Modem Setup screen displays a two Modem Configuration for the MA220; four Modem Configuration for the MA420 model, or eight modem configuration for the MA820 model. The Modem Setup screen defines the Modem Sharing behavior and general modem parameters, Country Code and number of rings before auto answer.

Prior to software release 1.03, the ports were configured for either RAS or modem sharing, for which they were then dedicated to just that role. Now, with software release 1.03, both roles are automatically enabled, alleviating the need for administrator intervention when either role is desired.

Still, only one application can use the modem at a time. If there is **not** a Telnet session connected to the POTS port, an incoming call will be handled by the MultiAccess as a RAS call. When there **is** an active Telnet session connected to the POTS port, the modem's configuration and behavior is then controlled by the application that opened the session, be it for inbound or outbound calls.

The TCP port used by Telnet to access the modem is dependent on how the Modem Sharing Pool option is used. If this option is set to "pool", port 6000 is used. All POTS modem ports set to pool, 6000, **must** have the same exact Modem Sharing options, with or without authentication, etc. When a Telnet client on the LAN opens a connection to 6000, it is given the lowest number POTS modem port in the pool that is available.

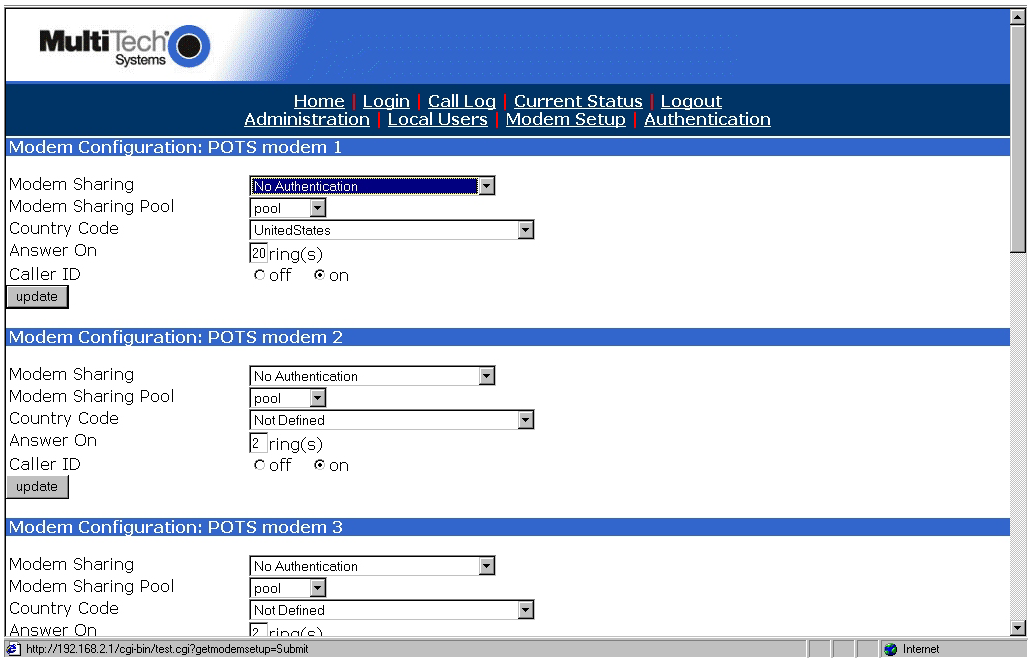
If this option is set to "non-pool", then a specific 7000+ number is sequentially associated to each POTS modem. POTS modem 1 is assigned 7000, POTS modem 2 assigned 7001 and so on incrementally through POTS modem 8 with 7007 for a MA820 unit.

Modem Sharing with authentication means a login prompt will be issued to the socket when it is opened. Who (what) ever opened the socket must provide appropriate credentials before access is given to the modem. When Modem Sharing with Radius Authentication is selected, the Radius server that will be used is defined in the Authentication menu.

When Modem Sharing with Local Authentication is selected, credentials (users) shown in the Local Users menu are to be used.

When Modem Sharing with RAW is selected – support for RFC 2217 (com port control via Telnet) will be disabled.

When access is granted to the modem, an "OK" response message will be issued.



Modem Configuration: POTS modem X Screen Field Definitions		
Field Name	**Values**	**Description**
Modem Sharing	Modem Sharing with no, local, or radius Authentication,and Modem Sharing- Raw Mode with no, local or radius Authentication	No Authentication – Immediate access is granted to the modem. Local Authentication – A valid set of credentials, defined in the Local User data base, is required before access is granted. Radius Authentication – A valid set of credentials, defined in the Radius User data base, is required before access is granted. Raw is the type of telnet socket used to access the shared modem.
Modem Sharing Pool	Pool or non-pool	Pool, TCP port 6000. All POTS modem ports set for pool must have the same exact Modem Sharing option. Non-pool, TCP port is a specific 7000+ number, sequentially associated. POTS modem 1 will use 7000, POTS modem 2 will use 7001 and so on through POTS modem 8 using 7007.
Country Code	Alphabetical	The Country Code configures the modem for the country that it is operating in.
Answer On	Numeric	The number of rings before the modem answers is defaulted to two rings. You can change the number of rings from zero to 255 rings.
Caller ID	On/off	This enables or disables the Caller ID output from the modem.
Update (button)		Click this button to update the configuration of the selected POTS modem.

Authentication Screen

This screen is used to define the authentication method and remote host address for calls. The ***Authentication/Radius Client Configuration:POTS modem X*** fields allow you to set these parameters on a per port basis. This screen displays two ports for the MA220, four ports for the model MA420 or eight ports for the model MA820.

Please Note: The Radius Client details defined here will also be used by the Modem Sharing process when it's set to Modem Sharing with Radius Authentication.

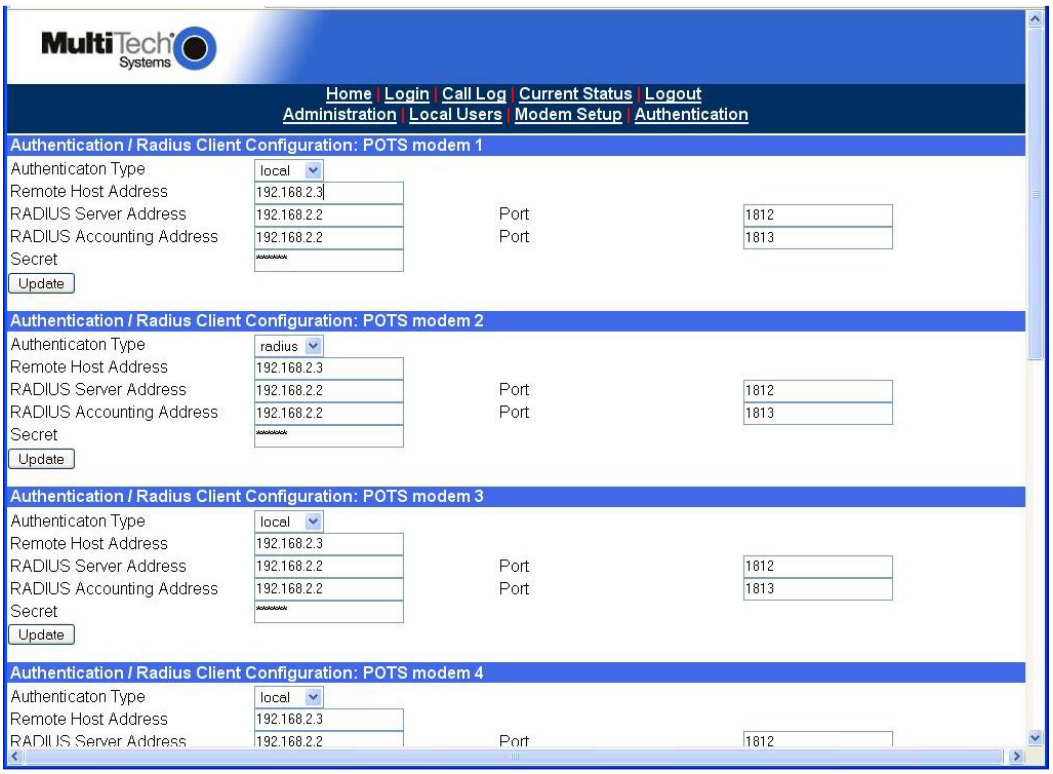
The Authentication Type field (on this screen) only applies to RAS Calls. When the type is set to Local, the MultiAccess will look to match the credentials provided by the caller with credentials listed in the Local Users menu. When the type is set to RADIUS, the MultiAccess will send the credentials to the RADIUS Server defined in this menu for authorization.

The Remote Host Address field defines the IP address issued to the user (PPP peer) dialed in on this port. This address needs to be on the same subnet (network number) as that of the MultiAccess. The type of PPP session is standard PAP authentication with IP as the network protocol.

The RADIUS Server Address field defines the location of your RADIUS Server that is to authorize the session. The RADIUS Server must be listening on the same UDP port that the RADIUS Client (MultiAccess) is sending the authorization request on.

The RADIUS Accounting Address field defines the location of your RADIUS Server that accepts accounting information. Normally, Radius Authorization and Radius Accounting functions are handled by the same RADIUS server, but they can be handled by separate servers. The RADIUS Accounting server must be listening on the same UDP port the RADIUS Client (MultiAccess) is sending accounting packets on. Radius accounting is traditionally used to track usage for billing purposes. RADIUS Accounting is a process that starts after successful RADIUS authentication. The MultiAccess sends an accounting start packet to the accounting server after it receives an access accept packet from the authorization server. When the user disconnects, the MultiAccess sends an accounting stop packet to the accounting server. RADIUS accounting summarizes the time and date, duration, POTS port connected on and IP address given to the user, for a particular call. RADIUS Accounting does not track the type or amount of data for the session, nor the places the user communicates with.

The Secret is an encryption key used by both the RADIUS Server and RADIUS Client and so it must be the same alpha numeric string (including case) defined in both. The MultiAccess implements MD5 encryption.


MultiTech Systems
Home | Login | Call Log | Current Status | Logout
Administration | Local Users | Modem Setup | Authentication
Authentication / Radius Client Configuration: POTS modem 1
Authenticaton Type local
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812
RADIUS Accounting Address 192.168.2.2 Port 1813
Secret
Update
Authentication / Radius Client Configuration: POTS modem 2
Authenticaton Type radius
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812
RADIUS Accounting Address 192.168.2.2 Port 1813
Secret
Update
Authentication / Radius Client Configuration: POTS modem 3
Authenticaton Type local
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812
RADIUS Accounting Address 192.168.2.2 Port 1813
Secret
Update
Authentication / Radius Client Configuration: POTS modem 4
Authenticaton Type local
Remote Host Address 192.168.2.3
RADIUS Server Address 192.168.2.2 Port 1812

Authentication/ Radius Client Configuration: POTS modem X Screen Field Definitions		
Field Name	**Values**	**Description**
Authentication Type	local or radius	Local is when the user credentials are stored locally within the MultiAccess, Local User menu. Radius is a network specific protocol used to communicate authentication requests between the authentication server and Radius client. User credentials are stored within the Radius server. The MultiAccess is a Radius client.
Remote Host Address	n.n.n.n	This is the IP address the MultiAccess will assign to the remote node, PPP client, if one is not dictated by the Radius server which is included in the authentication accept packet issued by the Radius server. This address should be on the same network number as that of the MultiAccess.
RADIUS Server Address	n.n.n.n	IP address of the Radius Server providing remote user verification.
Port	numeric	The UDP port number (ususally 1812) is used to communicate with the Radius Server. The Radius Server has to listen on the same set of UDP ports that the Radius Client, MultiAccess, is using.
RADIUS Accounting Address	n.n.n.n	IP address of the Radius Accounting host. Radius accounting is used to track a User's usage.
Port	numeric	The UDP port number (usually 1813) is used to communicate with the Radius Accounting host. The Radius Accounting host has to listen on the same set of UDP ports that the Radius Client, MultiAccess, is using.
Secret	Alphanumeric	The RADIUS Server secret. The server secret has to be identical to the one used by the RADIUS server and used to encrypt the remote user's password. The MultiAccess implements MD5 encryption.

Chapter 5 – Troubleshooting

No Response from the MultiAccess when trying to browse to it (web login screen does not appear).

Variable: New Install, unit is fresh out of the box and you have not previously communicated with it.

Is the unit connected to your network in accordance with the Quick Start Guide?

What exact 192.168.2.X IP address and subnet mask did you set your workstation to? The subnet mask should be 255.255.255.0. From your workstation, can you ping the IP address of your own workstation? If so, can you then ping the IP Address of the MultiAccess (which is set to 192.168.2.1)?

If not, is your workstation physically connected to the same Ethernet segment as what the MultiAccess is connected to? If not, connect your workstation to the same Ethernet switch or hub as that of the MultiAccess, or use an Ethernet cross over cable directly from your workstation to the MultiAccess. Can you ping 192.168.2.1 now? If not reboot your PC and the MultiAccess and try again.

Networking equipment (routers, firewalls, Ethernet switches, etc) can block communication if the network numbers are not allowed or properly routed.

Firewall and other security software can be installed on your workstation, blocking communication.

If you can ping the MultiAccess, but you still do not receive a login screen from the MultiAccess, is it really the MultiAccess that is responding to the ping? Turn the MultiAccess off and try the ping again - if there is still a response, it is coming from another computer.

Variable: HTTP (web) communication had previously been established and working, but now there is no response when trying to browse to the unit.

Do you know the IP address of the MultiAccess? If you ping it, do you get a response? If not, are you on the same local network (Ethernet segment) as that of the MultiAccess? If you are not, can a workstation on the same network as that of the MultiAccess, communicate with it? If not, is the unit still powered up and properly connected to your network.

Were any network changes or upgrades recently made, or new software added to your workstation(s)?

Firewalls, security software, networking equipment and etc can block all or certain types of IP communication (including pings\ICMP).

If you can ping the MultiAccess, but you still do not receive a login screen from the MultiAccess, can you Telnet to it (standard telnet port 23)? A login prompt should appear, use the same admin credentials (as with the web interface) to log in with. If successful you will be at a simple # prompt. Type the command “ps” (no quotes), is /usr/boa listed as one of the processes? This process is the web server. If boa is not running, contact Multi-Tech Tech Support.

If the MultiAccess unit does reply to the ping and you are still unable to view the MultiAccess web page, then call Multi-Tech Tech Support for more assistance (1-800-972-2439).

What if I don't get an email when I set the mail server address?

Variable: The mail server you defined can not be contacted.

During transmission, the mail server’s name you entered could not be resolved by the DNS Server.

Use a network analyzer to capture DNS and SMTP packets. Common security practices implemented today relating to MX packets, reverse look-ups and firewall settings can prevent successful delivery of e-mail messages.

Contact the MultiAccess unit using telnet and try to ping the mail server.

telnet 192.168.x.x
user: admin
password: admin
ping 192.168.y.y (where this is the address of the mail server)

If the mail server ping fails, you must determine why it failed.
The mail server may not be contact-able because it is on a different subnet. The mail server ping could also fail because the default gateway has been set incorrectly.
If the mail server ping succeeds, then try to ping the mail server using its domain name.

What if the remote users are failing authentication?

Variable: The shared secret is wrong (case sensitive), the user is giving the wrong password, or the user doesn't have appropriate rights.

Variable: The Radius server doesn't see the authentication request.

The MultiAccess was not added to the clients file within the Radius server, the Radius client is not set to the same set of UDP ports as the Radius server, the Radius client is pointing to the wrong Radius server/IP address, or there is a network problem blocking or dropping the request, Radius server uses UDP to communicate.

When the auth request is not seen by the Radius server, eventually the Radius client will report a "Radius Timeout" error, no response from the Radius server, and disconnect the user.

My Windows application is unable to successfully use the modem listed in the Phone and Modem applet of the control panel on my PC?

Variable: The MultiAccess can not tell which application, on the workstation, is opening the TCP port/socket.

Redirectors, telnet clients, and proprietary programs all appear the same to the MultiAccess because they all need to use/follow TCP/IP to get to the modem in the MultiAccess.

Telnet to the modem in the MultiAccess and issue AT commands, try to dial out. If it works, then the redirector is configured wrong
or the user application is configured wrong.

Certain users are unable to use the MultiAccess to dial out?

Variable: When the MultiAccess is configured for Modem Sharing with Radius Authentication, the user rights defined in the Radius server are not set correctly.

The Service Type Attribute in the Radius server configuration is not set to "Outbound".

Chapter 6: Warranty, Service, & Repair

Multi-Tech Warranty Statement

Multi-Tech Systems, Inc., (hereafter "MTS") warrants that its products will be free from defects in material or workmanship for a period of two, five, or ten years (depending on model) from date of purchase, or if proof of purchase is not provided, two, five, or ten years (depending on model) from date of shipment.

MTS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by Customer or any party without MTS's written authorization, or used in any manner inconsistent with MTS's instructions.

MTS's entire obligation under this warranty shall be limited (at MTS's option) to repair or replacement of any products which prove to be defective within the warranty period or, at MTS's option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS's factory — transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES, AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PRICE FOR DEFECTIVE PRODUCTS.

Repair Procedures for U.S. and Canadian Customers

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota factory:

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, MN 55112
Attn: Repairs, Serial # _____

A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS to destinations in U.S. and Canada.

Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), and your telephone number. If the product is out of warranty, a payment in advance is required. Acceptable means of payment include credit card, wire transfer or a check in U.S. dollars drawn on a U.S. Bank.

For out of warranty repair charges, go to COMPANY/Policies/warranty/

Extended two-year overnight replacement service agreements are available for selected products. Please call MTS at (888) 288-5470, extension 5308 or visit our web site at PARTNERS/Programs/overnight_replacement for details on rates and coverage's.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at (800) 972-2439 or email support@multitech.com. Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at (800) 328-9717 or (763) 717-5631, or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Customers (Outside U.S.A. and Canada)

Your original point of purchase Reseller may offer the quickest and most economical repair option for your Multi-Tech product. You may also contact any Multi-Tech sales office for information about the

nearest distributor or other repair service for your Multi-Tech product. The Multi-Tech sales office directory is available at http://www.multitech.com/ PARTNERS/Channels/offices/

In the event that factory service is required, products may be shipped, freight prepaid to our Mounds View, Minnesota factory. Recommended international shipment methods are via Federal Express, UPS or DHL courier services, or by airmail parcel post; shipments made by any other method will be refused. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a payment in advance is required. Acceptable means of payment include credit card, wire transfer or a check in U.S. dollars drawn on a U.S. bank. Repaired units shall be shipped freight collect, unless other arrangements are made in advance.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you or email support@multitech.com. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A., or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Repair Procedures for International Distributors

International distributors should contact their MTS International sales representative for information about the repair of the Multi-Tech product(s).

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our International Technical Support department at +(763)717-5863. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A. or email mtsrepair@multitech.com.

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

Replacement Parts

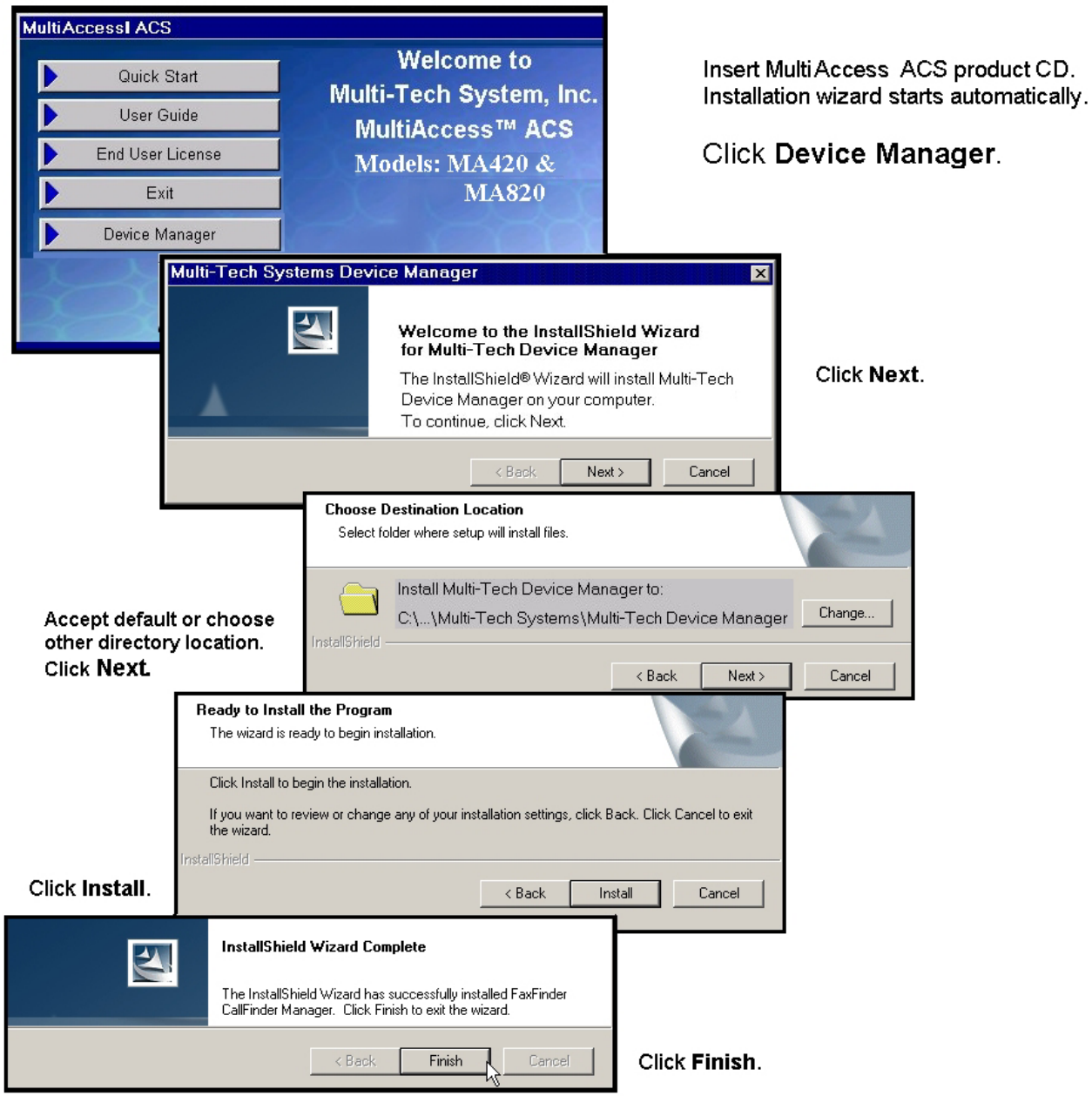
SupplyNet, Inc., can supply you with replacement power supplies, cables and connectors for selected Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at the following addresses:

Mail: SupplyNet, Inc.
614 Corporate Way
Valley Cottage, NY 10989
Phone: 800 826-0279
Fax: 914 267-2420
Email: *info@thesupplynet.com*
Internet: http://www.thesupplynet.com

Appendix A – Device Manager Utility

The Device Manager utility is used to synchronize phonebooks (local user data bases), backup and restore a configuration, and update firmware in a MultiAccess ACS unit and its accompanying POTS modems. The Device Manager utility can manage multiple MultiAccess units on the same network and on other networks as long as the manager has access to that network.

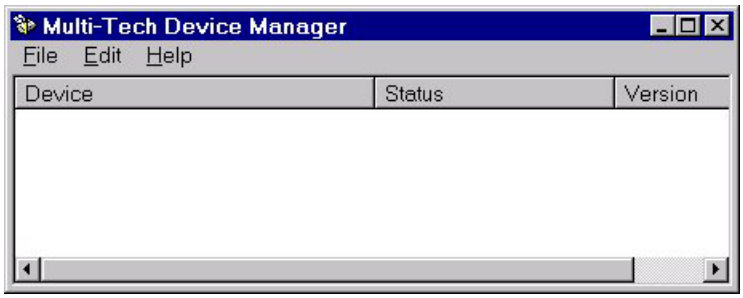
The process of installing the Device Manager software is explained in the illustration below.



Adding a Device to the Manager

In order for the Device Manager to recognize a MultiAccess unit, the MultiAccess must be added to the manager. The Device Manager can manage multiple MultiAccess units as long as the Device Manager has access to that network.

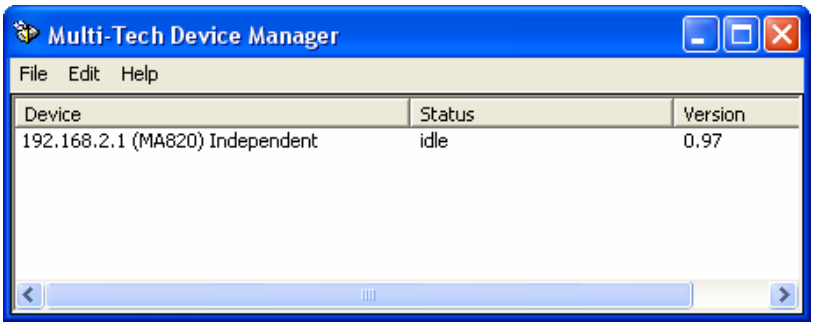
1. To launch the Device Manager program from the Windows desktop, go to **Start** | **Programs** | **Multi-Tech Device Manager** I **Multi-Tech Device Manager**. The Device Manager main screen will appear.



2. To add a MultiAccess to the Manager, click **Edit** menu and select **Add Device**. When the **Add Device Address** screen appear, click on the **Select Server** down arrow and select **MultiAccess ACS**.

Add Device Address
Select Server
MultiAccess ACS
Server Behind Firewall
Enter Address
This can either be an IP Address (eg. 192.168.2.1) or a domain name that is assigned to the fax server (eg. Multi-Tech Device Manager1.multitech.prv)
Username:
Password:
This is the user ID/password combination assigned to you by your administrator to allow you to send faxes using this fax server.
OK
Cancel

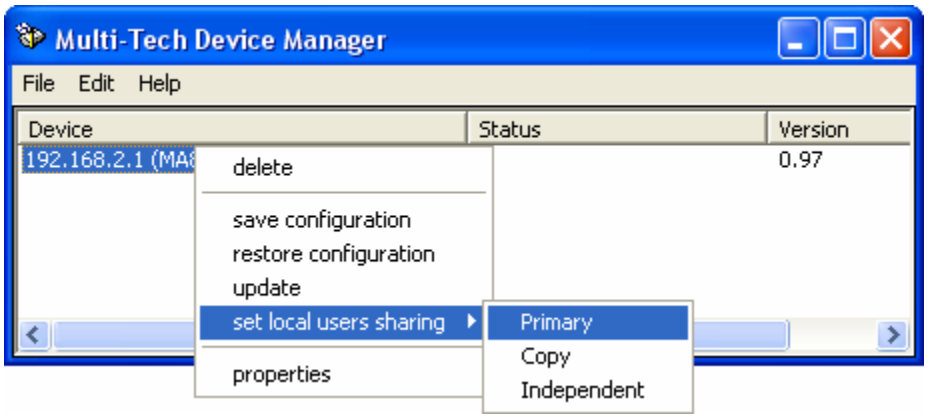
3. In the **Enter Address** window, enter the IP address for the unit you are adding.
4. In the **Username** and **Password** windows, enter the administrator's username and password for the unit you are adding.
5. Click **OK** when you are finished.
6. The Device Manager screen appears with the added Device.



Set Local User Sharing

Local user sharing must be set up per unit before local user data bases can be synchronized. When MultiAccess local users are synchronized, all data bases contain the same user crentials except for the administrator accounts. One MultiAccess unit (the **Primary** unit) holds the master list that is transmitted (using the **Synchronize Phonebooks** command) to other MultiAccess units on the network (**Copy** units). MultiAccess units can operate on the same network, but have independent local user data bases, in which case they are designated **Independent**.

Designating one MultiAccess as the master local user data base. In the main **Device Manager** screen, right-click on the unit to be designated as master, scroll to **Set local user Sharing**, and select **Primary**.



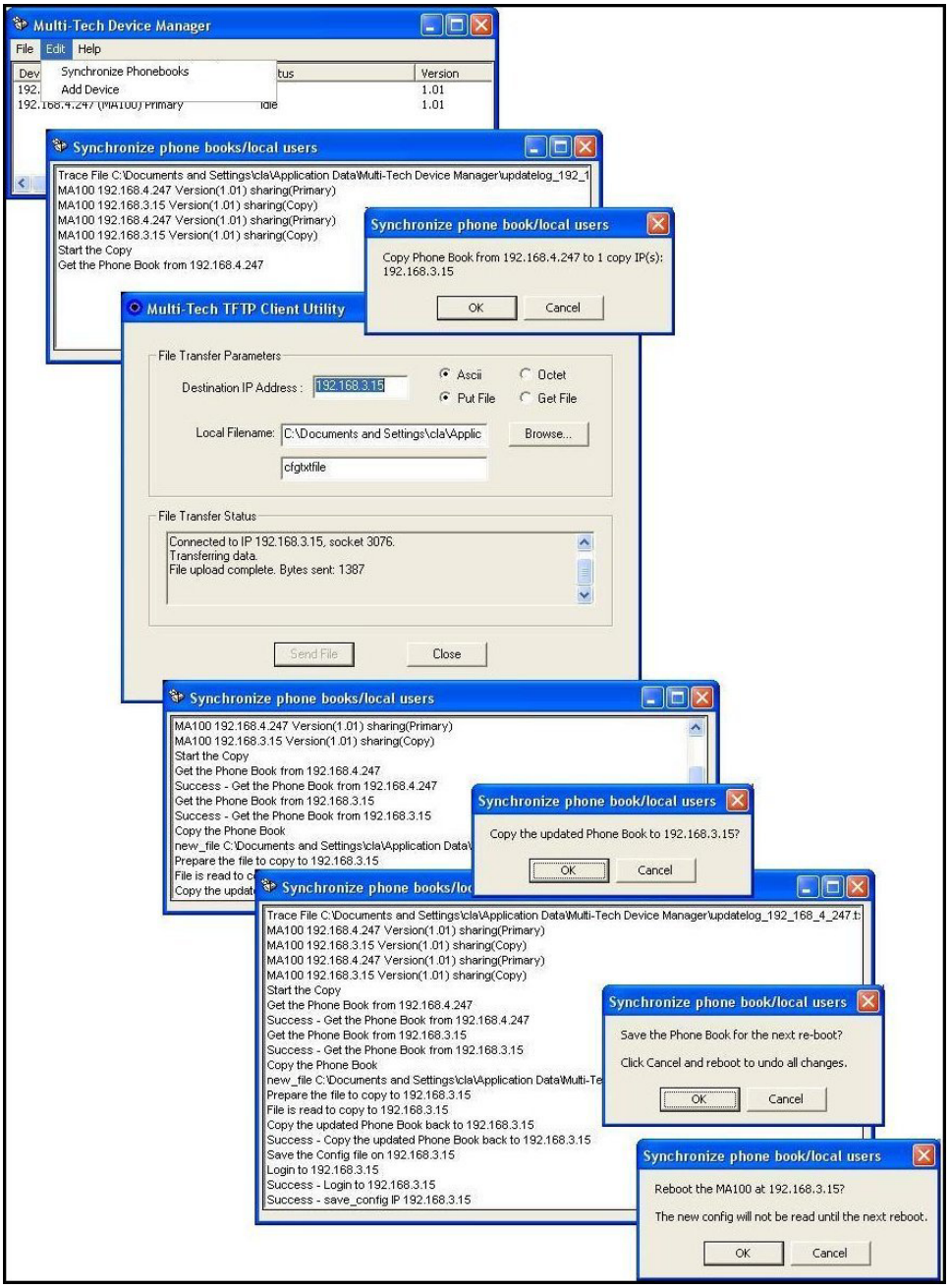
*Designating all other MultiAccess units participating in local user sharing as **Copy** units*. In the main **Device Manager** screen, right-click on each unit to share the master local user data base, and select **Copy**.

Designating a MultiAccess as independent. In the main **Device Manager** screen, right-click on each unit to be designated as independent, scroll to **Set local user Sharing**, and select **Independent**.

Synchronize Phonebooks/Local Users

When the MultiAccess Local Users data bases are synchronized, all non-administrative listings match. One MultiAccess unit (primary unit) holds the master data base that is transmitted to other remote units on the network (copy units). MultiAccess units can operate on the network, but have independent Local Users, in which case they are designated as Independent. Independent units are ignored during synchronization.

1. *Invoking synchronization*. Click on the **Edit** menu and select **Synchronize Phonebooks/local users**.
2. The **Synchronize Phone Books** screen will appear along with a series of transient screens (denoting tftp data transfers) and confirmation screens.


Multi-Tech Device Manager
File
Edit
Help
Synchronize Phonebooks
Add Device
Version
1.01
1.01
Synchronize phone books/local users
Trace File C:\Documents and Settings\cla\Application Data\Multi-Tech Device Manager\updatelog_192_1
MA100 192.168.4.247 Version(1.01) sharing(Primary)
MA100 192.168.3.15 Version(1.01) sharing(Copy)
MA100 192.168.4.247 Version(1.01) sharing(Primary)
MA100 192.168.3.15 Version(1.01) sharing(Copy)
Start the Copy
Get the Phone Book from 192.168.4.247
Synchronize phone book/local users
Copy Phone Book from 192.168.4.247 to 1 copy IP(s):
192.168.3.15
OK
Cancel
Multi-Tech TFTP Client Utility
File Transfer Parameters
Destination IP Address :
192.168.3.15
Ascii
Octet
Put File
Get File
Local Filename:
C:\Documents and Settings\cla\Applic
Browse...
cfgtxtfile
File Transfer Status
Connected to IP 192.168.3.15, socket 3076.
Transferring data.
File upload complete. Bytes sent: 1387
Send File
Close
Synchronize phone books/local users
MA100 192.168.4.247 Version(1.01) sharing(Primary)
MA100 192.168.3.15 Version(1.01) sharing(Copy)
Start the Copy
Get the Phone Book from 192.168.4.247
Success - Get the Phone Book from 192.168.4.247
Get the Phone Book from 192.168.3.15
Success - Get the Phone Book from 192.168.3.15
Copy the Phone Book
Prepare the file to copy to 192.168.3.15
Synchronize phone book/local users
Copy the updated Phone Book to 192.168.3.15?
OK
Cancel
Synchronize phone books/local users
Trace File C:\Documents and Settings\cla\Application Data\Multi-Tech Device Manager\updatelog_192_168_4_247.t
MA100 192.168.4.247 Version(1.01) sharing(Primary)
MA100 192.168.3.15 Version(1.01) sharing(Copy)
MA100 192.168.4.247 Version(1.01) sharing(Primary)
MA100 192.168.3.15 Version(1.01) sharing(Copy)
Start the Copy
Get the Phone Book from 192.168.4.247
Success - Get the Phone Book from 192.168.4.247
Get the Phone Book from 192.168.3.15
Success - Get the Phone Book from 192.168.3.15
Copy the Phone Book
Prepare the file to copy to 192.168.3.15
File is read to copy to 192.168.3.15
Copy the updated Phone Book back to 192.168.3.15
Success - Copy the updated Phone Book back to 192.168.3.15
Save the Config file on 192.168.3.15
Login to 192.168.3.15
Success - Login to 192.168.3.15
Success - save_config IP 192.168.3.15
Synchronize phone book/local users
Save the Phone Book for the next re-boot?
Click Cancel and reboot to undo all changes.
OK
Cancel
Synchronize phone book/local users
Reboot the MA100 at 192.168.3.15?
The new config will not be read until the next reboot.
OK
Cancel

3. After the master local users data is transferred to the first **Copy** MultiAccess unit and that unit has been rebooted, the **Device Manager** will automatically begin synchronizing the additional **Copy** MultiAccess unit in the system (if any) until all have been synchronized.

Updating Firmware

Over time, new versions of MultiAccess firmware will be issued. When these newer versions become available, you will want to secure the firmware files (typically by downloading them from the Multi- Tech web site) and install them on the MultiAccess.

There are two parts to a full firmware update:

(a) updating POTS Modem x firmware (with file name of the form **dwqg<*x*><*y*>.hex;** where ***x*** is a number and ***y*** is a letter),

(b) updating MultiAccess firmware (with file name of the form **MA220-<x>-<y>.bin**, **MA420-<*x*>-<*y*>.bin** or **MA820-<x><y>.bin**).

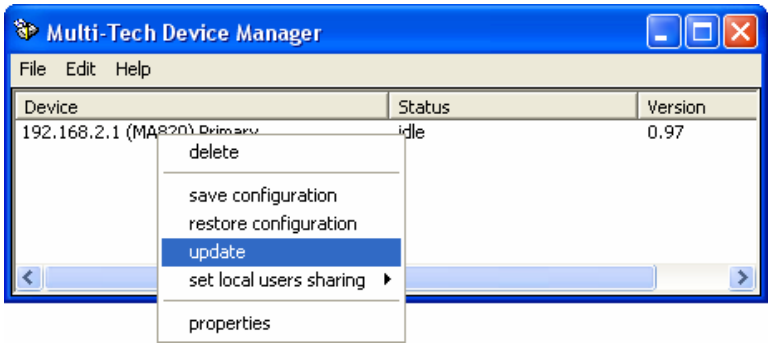
NOTE: *You must have the update files on your computer **before** beginning this procedure.* The latest version of these files will be available on the Multi-Tech web site. Put them in a directory on a computer connected to the network on which the MultiAccess unit is running.

NOTE: Updating the MultiAccess unit will take it out of operation for a few minutes (allow 10 minutes for each update if you already have the new firmware in a directory on the host computer). Do the update at a time that is not critical to your organization's usage of the MultiAccess service.

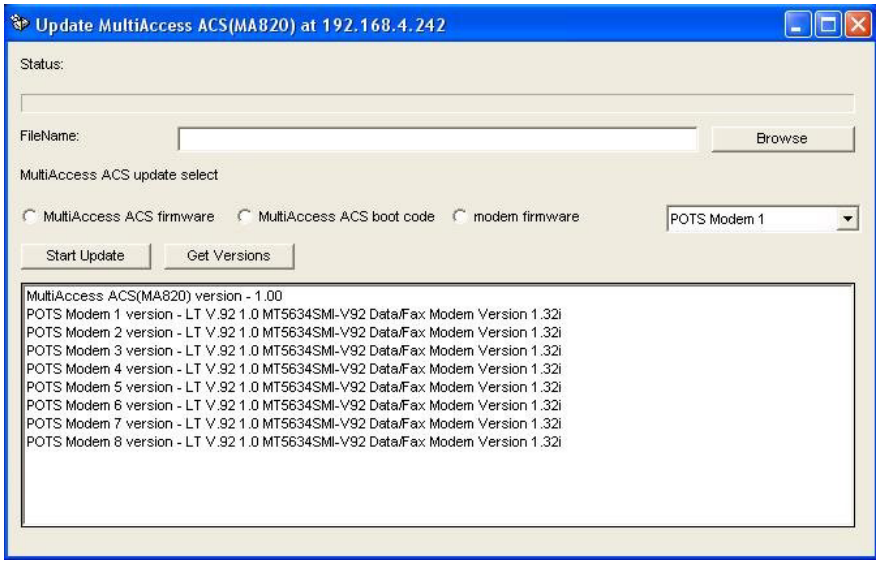
To update firmware, follow the steps shown below.

MultiAccess Modem Firmware Update

1. Bring up the **Device Manager** software main screen. In the **Device** column, identify the MultiAccess unit on which the update is to be done. Be sure that the Status of that MultiAccess unit is **idle** before continuing. (You cannot update the MultiAccess while it is handling a call.) Select the MultiAccess unit and right-click on it. In the menu that appears, select **Update**.

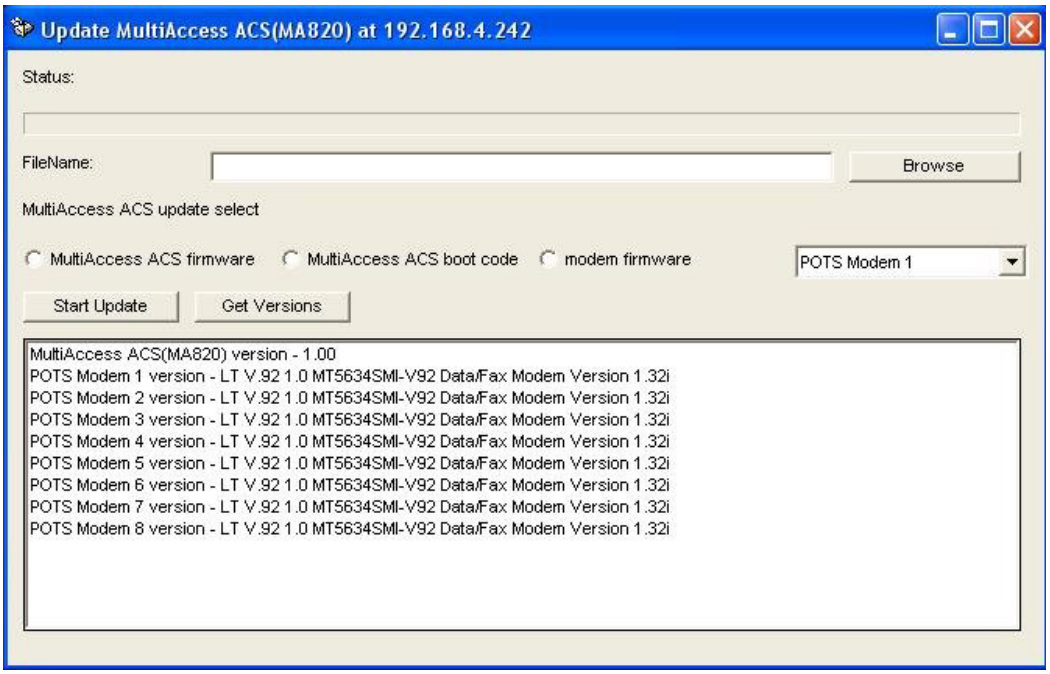


2. The **Update MultiAccess ACS at N.N.N.N** screen will appear. The current firmware versions for the MultiAccess's POTS Modems will be listed in the main window.

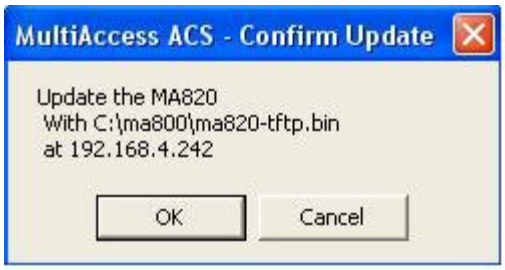

Update MultiAccess ACS(MA820) at 192.168.4.242
Status:
FileName:
Browse
MultiAccess ACS update select
MultiAccess ACS firmware
MultiAccess ACS boot code
modem firmware
POTS Modem 1
Start Update
Get Versions
MultiAccess ACS(MA820) version - 1.00
POTS Modem 1 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 2 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 3 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 4 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 5 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 6 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 7 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 8 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i

In the bottom (and largest) pane of the **Update MultiAccess ACS at n.n.n.n** window, read the list and write down the version of firmware currently in use for the POTS modem. Compare the version with the update file that you plan to use. *Make sure that the file to be installed really does supersede the one currently installed.*

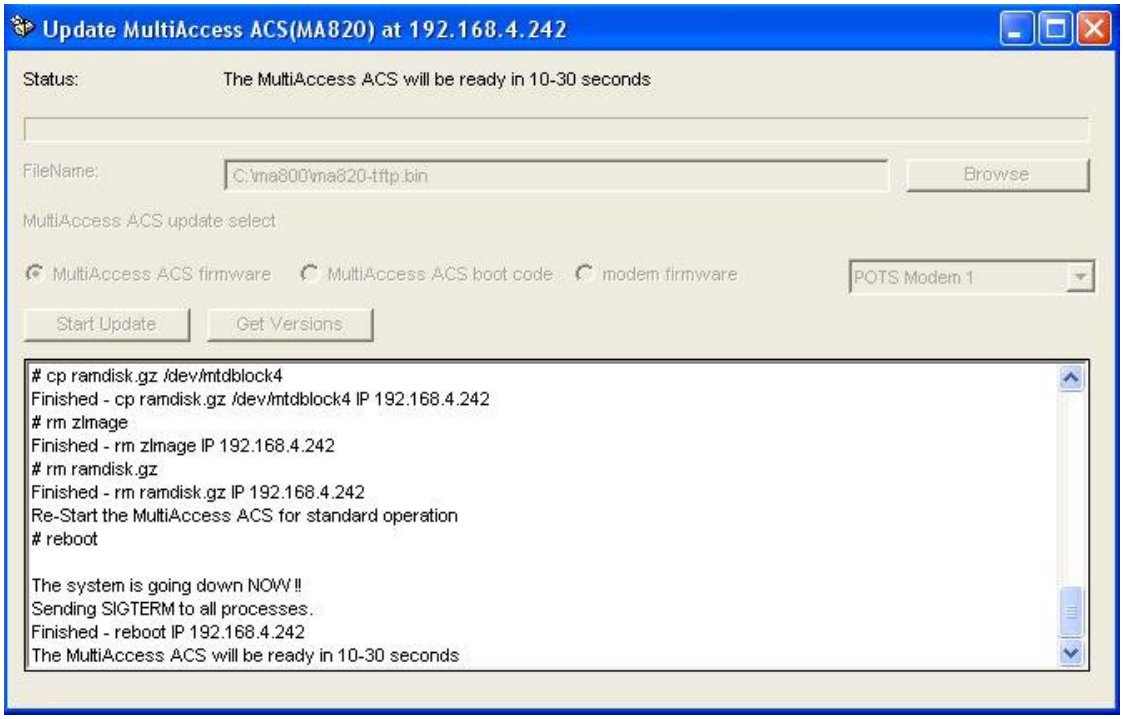
3. In the MultiAccess ACS update select field, Select “modem firmware”.
4. Click on the POTS Modem 1 pull down arrow and select the POTS Modem X to update.
5. Browse to the location of the most recent firmware file.


Update MultiAccess ACS(MA820) at 192.168.4.242
Status:
FileName:
Browse
MultiAccess ACS update select
MultiAccess ACS firmware
MultiAccess ACS boot code
modem firmware
POTS Modem 1
Start Update
Get Versions
MultiAccess ACS(MA820) version - 1.00
POTS Modem 1 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 2 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 3 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 4 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 5 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 6 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 7 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 8 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i

6. Click **Start Update**.
7. The **MultiAccess ACS – Confirm Update** screen will appear. Click **OK**.



8. The updating process will take as long as a minute. During this time, several messages will appear in the **Update MultiAccess ACS at N.N.N.N** window. A transient **TFTP** screen may appear briefly. If the updating process has been successful, the final status line will say "Finished – The MultiAccess ACS is ready."

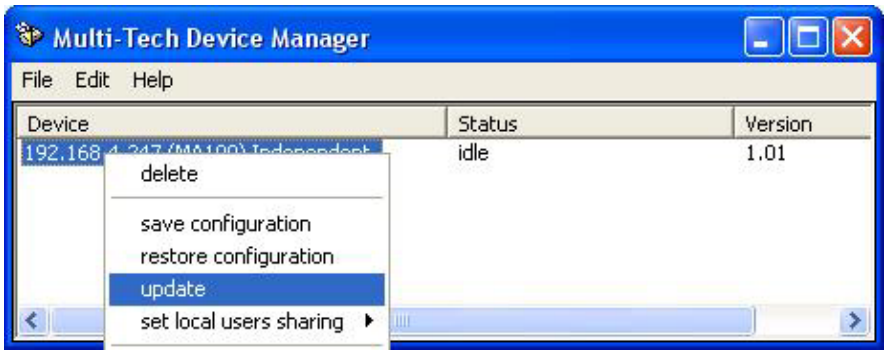

Update MultiAccess ACS(MA820) at 192.168.4.242
Status:
The MultiAccess ACS will be ready in 10-30 seconds
FileName:
C:\ma800\ma820-tftp.bin
Browse
MultiAccess ACS update select
MultiAccess ACS firmware
MultiAccess ACS boot code
modem firmware
POTS Modem 1
Start Update
Get Versions
cp ramdisk.gz /dev/mtdblock4
Finished - cp ramdisk.gz /dev/mtdblock4 IP 192.168.4.242
rm zImage
Finished - rm zImage IP 192.168.4.242
rm ramdisk.gz
Finished - rm ramdisk.gz IP 192.168.4.242
Re-Start the MultiAccess ACS for standard operation
reboot
The system is going down NOW !!
Sending SIGTERM to all processes.
Finished - reboot IP 192.168.4.242
The MultiAccess ACS will be ready in 10-30 seconds

9. The updating process is now complete. Click the "X" in the upper-right corner to return to the main **Device Manager** screen.

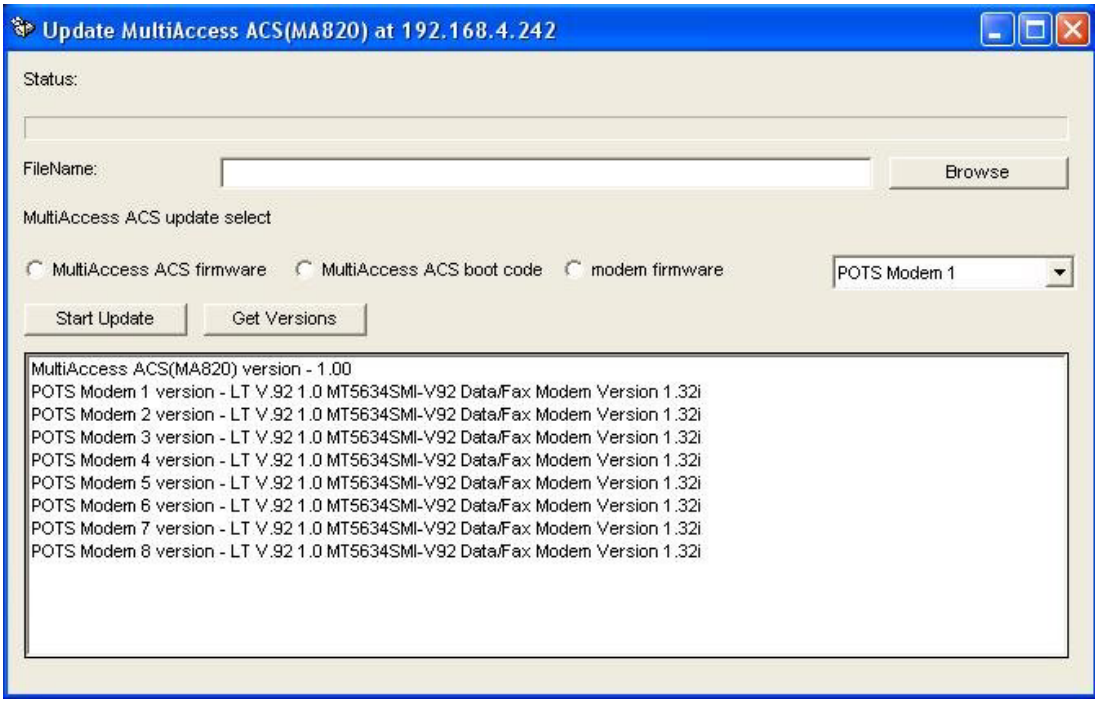
10. Repeat steps 1-8 for the remaining POTS modems.

MultiAccess Firmware Update

1. In the **Device** column of the **Device Manager** screen, identify the MultiAccess unit on which the update is to be done. Be sure that the Status of that MultiAccess unit is **idle** before continuing. (You cannot update the MultiAccess while it is handling a call.) Select that MultiAccess unit and right-click on it. In the menu that appears, select **Update**.



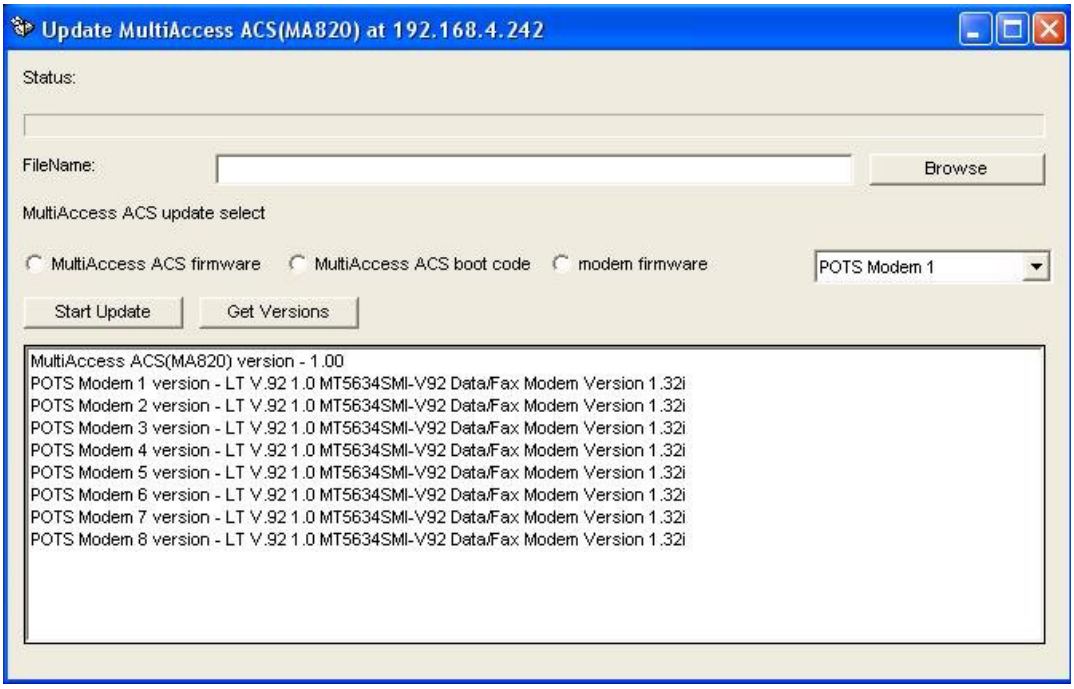
2. The **Update MultiAccess ACS at N.N.N.N** screen will appear. The current firmware versions for the MultiAccess firmware and for POTS Modems will be listed in the main window.


Update MultiAccess ACS(MA820) at 192.168.4.242
Status:
FileName:
Browse
MultiAccess ACS update select
MultiAccess ACS firmware
MultiAccess ACS boot code
modem firmware
POTS Modem 1
Start Update
Get Versions
MultiAccess ACS(MA820) version - 1.00
POTS Modem 1 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 2 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 3 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 4 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 5 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 6 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 7 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 8 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i

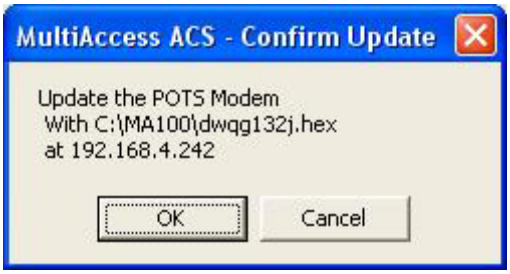
In the bottom (and largest) pane of the **Update MultiAccess ACS at N.N.N.N** window, read the list and write down the version of firmware currently in use for the MultiAccess. Compare the version with the update file that you plan to use. **Make sure that the file to be installed really does supersede the one currently installed on the MultiAccess.**

3. In the **MultiAccess ACS Update Select** field, select "MultiAccess ACS firmware."

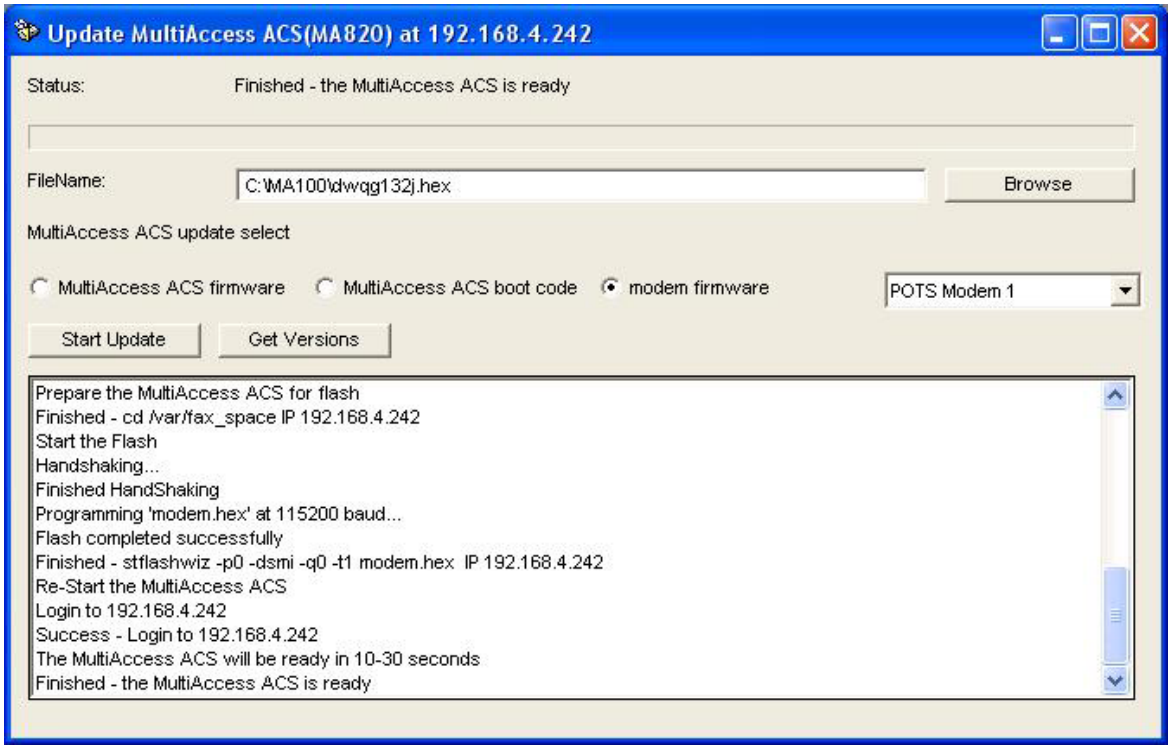
4. Browse to the location of the most recent firmware file.


Update MultiAccess ACS(MA820) at 192.168.4.242
Status:
FileName:
Browse
MultiAccess ACS update select
MultiAccess ACS firmware
MultiAccess ACS boot code
modem firmware
POTS Modem 1
Start Update
Get Versions
MultiAccess ACS(MA820) version - 1.00
POTS Modem 1 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 2 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 3 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 4 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 5 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 6 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 7 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i
POTS Modem 8 version - LT V.92 1.0 MT5634SMI-V92 Data/Fax Modem Version 1.32i

5. Click **Start Update**.
6. The **MultiAccess ACS – Confirm Update** screen will appear. Click **OK**.



7. The updating process will take as long as a minute. During this time, several messages will appear in the **Update MultiAccess ACS at N.N.N.N** window. A transient **TFTP** screen may appear briefly. If the updating process has been successful, the final status line will say "Finished – The MultiAccess ACS is ready."



8. Close the **Update MultiAccess ACS at N.N.N.N** window. In the main **Device Manager** window, the updated version will be listed.

9. The updating process is now complete.

Appendix B – Regulatory Information

47 CFR Part 68 Telecom

1. This equipment complies with Part 68 of the 47 CFR rules and the requirements adopted by the ACTA. Located on this equipment is a label that contains, among other information, the registration number and ringer equivalence number (REN) for this equipment or a product identifier in the format:
   For current products is ***US:AAAEQ##Txxxx***.
   For legacy products is ***AU7USA-xxxxx-xx-x***.
   If requested, this number must be provided to the telephone company.
2. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable 47 CFR Part 68 rules and requirements adopted by the ACTA. It's designed to be connected to a compatible modular jack that is also compliant.
3. The ringer equivalence number (REN) is used to determine the number of Devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the Devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of Devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##Txxxx. The digits represented by ## are the REN without a decimal point (*e.g.*, 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.
4. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.
5. The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.
6. If trouble is experienced with this equipment, please contact Multi-Tech Systems, Inc. at the address shown below for details of how to have the repairs made. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.
7. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.
8. No repairs are to be made by you. Repairs are to be made only by Multi-Tech Systems or its licensees. Unauthorized repairs void registration and warranty.
9. If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment does not disable your alarm equipment.

   If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.
10. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.
11. This equipment is hearing aid compatible.

12. Manufacturing Information:

Manufacturer:	Multi-Tech Systems, Inc.
Trade Name:	MultiAccess®
Model Number:	MA220/420/MA820
Registration No:	AU7USA-25814-M5-E
Ringer Equivalence:	0.3B
Modular Jack (USOC):	RJ11C or RJ11W (single line)
Service Center in USA:	Multi-Tech Systems, Inc. 2205 Woodale Drive Mounds View, MN 55112 U.S.A. (763) 785-3500 (763) 785-9874 Fax

47 CFR Part 15 Regulation

This equipment has been tested and found to comply with the limits for a **Class B** digital Device, pursuant to 47 CFR Part 15 regulations. The stated limits in this regulation are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Plug the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

This Device complies with Part 15 of the CFR 47 rules. Operation of this Device is subject to the following conditions:

(1) This Device may not cause harmful interference, and

(2) this Device must accept any interference that may cause undesired operation.

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canadian Limitations Notice

Notice: The ringer equivalence number (REN) assigned to each terminal Device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of Devices subject only to the requirement that the sum of the ringer equivalence numbers of all the Devices does not exceed 5.

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational, and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

Safety and EMC Product Approvals

Safety
EN60950
UL60950
cUL

EMC Product Approvals
EN 55022
FCC Part 15 Class A
EN 55024

CE

EMC, Safety, and Directive Compliance

The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility;

and

Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limit;

And

Council Directive 1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

Appendix C – Waste Electrical and Electronic Equipment (WEEE) Statement

July, 2005

The WEEE directive places an obligation on EU-based manufacturers, distributors, retailers and importers to take-back electronics products at the end of their useful life. A sister Directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

Appendix D: C-ROHS HT/TS Substance Concentration

依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP) 标准 - 中华人民共和国《电子信息产品污染控制管理办法》（第 39 号），也称作中国 RoHS，下表列出了 Multi-Tech Systems Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

成分名称	有害/有毒物质/元素					
	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
IC	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LED	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

X 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。

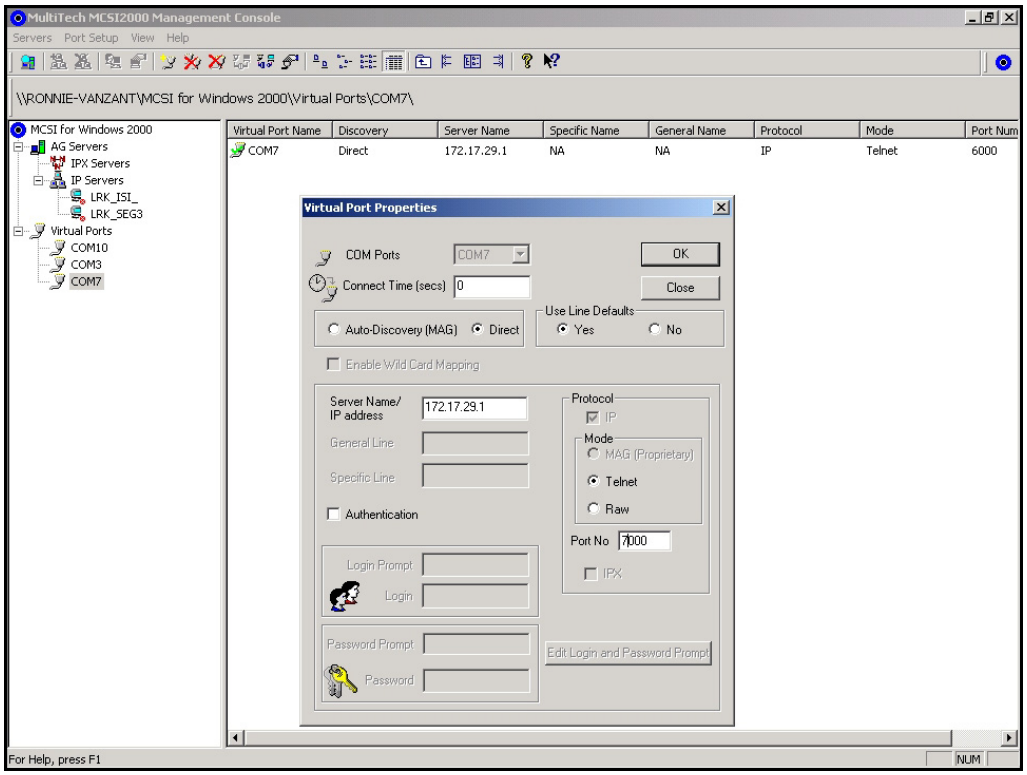
O 表示不含该物质或者该物质的含量水平在上述限量要求之内。

Appendix E – MCSI2000 Parameters

Setting Up MCSI2000 Com Port Redirector

Add one MCSI2000 com port to your workstation. Reboot the workstation. The properties of the MCSI2000 com port should be:

- Connect Time = 0
- Direct (Not MAG)
- Use Line Defaults Yes
- Server IP address is that of the MultiAccess
- Protocol Telnet
- Port Number 7000
- Authentication No.



For further details on how install and operate MCSI200, refer to the MCSI For Windows 2000 and XP Software Installation Guide on your product CD.

Appendix F – Modem AT Commands

AT Commands

Command: **AT** **Attention Code**
Values: N/A
Description: The attention code precedes all command lines except **A/**, **A:** and escape sequences.

Command: **ENTER Key**
Values: N/A
Description: Press the ENTER (RETURN) key to execute most commands.

Command: **A** **Answer**
Values: N/A
Description: Answer call before final ring.

Command: **A/** **Repeat Last Command**
Values: N/A
Description: Repeat the last command string. Do not precede this command with AT. Do not press ENTER to execute.

Command: **B*n*** **Communication Standard Setting**
Values: *n* = 0–3, 15, 16
Default: 0 and 15
Description:

B0	Select ITU-T V.22 mode when modem is at 1200 bps.
B1	Select Bell 212A when modem is at 1200 bps.
B2	Deselect V.23 reverse channel (same as **B3**).
B3	Deselect V.23 reverse channel (same as **B2**).
B15	Select V.21 when the modem is at 300 bps.
B16	Select Bell 103J when the modem is at 300 bps.

Command: **D*s*** **Dial**
Values: *s* = dial string (phone number and dial modifiers)
Default: none
Description: Dial telephone number *s*, where *s* may up to 40 characters long and include the 0–9, *, #, , B, C, and D characters, and the L, P, T, V, W, S, comma (,), semicolon (;), !, @, ^ and $ dial string modifiers.

Dial string modifiers:

L Redial last number. (Must be placed immediately after **ATD**.)
P Pulse-dial following numbers in command.
T Tone-dial following numbers in command (default).
V Switch to speakerphone mode and dial the following number. Use **ATH** command to hang up.
W Wait for a new dial tone before continuing to dial. (**X2**, **X4**, **X5**, **X6**, or **X7** must be selected.)
, Pause during dialing for time set in register S8.
; Return to command mode after dialing. (Place at end of dial string.)
! Hook flash. Causes the modem to go on-hook for one-half second, then off-hook again.
@ Wait for quiet answer. Causes modem to wait for a ringback, then 5 seconds of silence, before processing next part of command. If silence is not detected, the modem returns a NO ANSWER code.
^ Disable data calling tone transmission.
$ Detect AT&T call card "bong" tone. The character should follow the phone number and precede the user's call card number: **ATDT1028806127853500$123456789**

Command: **DS=*y*** **Dial Stored Telephone Number**
Values: *n* = 0–2 (0–1 for SMI-Parallel {internal})
Default: none
Description: Dial a number previously stored in directory number *y* by the **&Zy=x** command. Example: **ATDS=2**

Command: **E*n*** **Echo Command Mode Characters**
Values: *n* = 0 or 1
Default: 1
Description:
E0 Do not echo keyboard input to the terminal.
E1 Do echo keyboard input to the terminal.

Command: **F*n*** **Echo Online Data Characters**
Values: *n* = 1
Default: 1
F0 Enable online data character echo. (Not supported.)
F1 Disable online data character echo (included for backward compatibility with some software).

Command: **H*n*** **Hook Control**
Values: *n* = 0 or 1
Default: 0
Description:
H0 Go on-hook (hang up).
H1 Go off-hook (make the phone line busy).

Command: I*n* **Information Request**

Values: *n* = 0–5, 9, 11

Default: None

Description:

I0 Display default speed and controller firmware version.
I1 Calculate and display ROM checksum (e.g., *12AB*).
I2 Check ROM and verify the checksum, displaying *OK* or *ERROR*.
I3 Display default speed and controller firmware version.
I4 Display firmware version for data pump (e.g., 94).
I5 Display the board ID: software version, hardware version, and country/region ID
I9 Display the country/regional code (e.g., *NA Ver. 1*).
I11 Display diagnostic information for the last modem connection, such as DSP and firmware version, link type, line speed, serial speed, type of error correction/data compression, number of past retrains, etc.

Command: M*n* **Monitor Speaker Mode**

Values: *n* = 0, 1, 2, or 3

Default: 1

Description:

M0 Speaker always off.
M1 Speaker on until carrier signal detected.
M2 Speaker always on when modem is off-hook.
M3 Speaker on until carrier is detected, except while dialing.

Command: N*n* **Modulation Handshake**

Values: *n* = 0 or 1

Default: 1

Description:

N0 Modem performs handshake only at communication standard specified by S37 and the B command.
N1 Modem begins handshake at communication standard specified by S37 and the B command. During handshake, fallback to a lower speed can occur.

Command: O*n* **Return Online to Data Mode**

Values: 0, 1, 3

Default: None

Description:

O0 Exit online command mode and return to data mode (see +++*AT*<*CR*> escape sequence).
O1 Issue a retrain and return to online data mode.
O3 Issue a rate renegotiations and return to data mode.

Command: P **Pulse Dialing**

Values: P, T

Default: T

Description: Configures the modem for pulse (non-touch-tone) dialing. Dialed digits are pulsed until a **T** command or dial modifier is received.

Command: Q*n* **Result Codes Enable/Disable**

Values: *n* = 0 or 1

Default: 0

Description:

Q0 Enable result codes.
Q1 Disable result codes.
Q2 Returns an *OK* for backward compatibility with some software.

Command: **Sr=*n*** **Set Register Value**
Values: *r* = S-register number; *n* varies
Default: None
Description: Set value of register S*r* to value of *n*, where *n* is entered in decimal format (e.g., S0=1).

Command: **Sr?** **Read Register Value**
Values: *r* = S-register number
Default: None
Description: Read value of register **S*r*** and display it in 3-digit decimal form (e.g., **S2?** gives the response *043)*.

Command: **T** **Tone Dialing**
Values: P, T
Default: T
Description: Configures the modem for DTMF (touch-tone) dialing. Dialed digits are tone dialed until a **P** command or dial modifier is received.

Command: **V*n*** **Result Code Format**
Values: *n* = 0 or 1
Default: 1
Description:
V0 Displays result codes as digits (terse response).
V1 Displays result codes as words (verbose response).

Command: **W*n*** **Result Code Options**
Values: *n* = 0, 1, or 2
Default: 2
Description:
W0 CONNECT result code reports serial port speed, disables protocol result codes.
W1 CONNECT result code reports serial port speed, enables protocol result codes.
W2 CONNECT result code reports line speed, enables protocol result codes.

Command: **X*n*** **Result Code Selection**
Values: *n* = 0–7
Default: 4
Description:
X0 Basic result codes (*CONNECT*); does not look for dial tone or busy signal.
X1 Extended result codes (*CONNECT 46000 V42bis*); does not look for dial tone or busy signal.
X2 Extended result codes with *NO DIALTONE*; does not look for busy signal.
X3 Extended result codes with *BUSY*; does not look for dial tone.
X4 Extended result codes with *NO DIALTONE* and *BUSY*.
X5 Extended result codes with *NO DIALTONE* and *BUSY*.
X6 Extended result codes with *NO DIALTONE* and *BUSY*.
X7 Basic result codes with *NO DIALTONE* and *BUSY*.

Command: **Z*n*** **Modem Reset**
Values: *n* = 0 or 1
Default: None
Description:
Z0 Reset modem to profile saved by the last **&W** command.
Z1 Same as **Z0**.

Command: &C*n* **Data Carrier Detect (DCD) Control**
Values: *n* = 0, 1, 2
Default: 1
Description:
&C0 Forces the DCD circuit to be always ON.
&C1 DCD goes ON when the remote modem's carrier signal is detected, and goes OFF when the carrier signal is not detected.
&C2 DCD turns OFF upon disconnect for time set by S18. It then goes high again (for some PBX phone systems).

Command: &D*n* **Data Terminal Ready (DTR) Control**
Values: *n* = 0, 1, 2, or 3
Default: 2
Description:
&D0 Modem ignores true status of DTR signal and responds as if it is always on.
&D1 If DTR drops while in online data mode, the modem enters command mode, issues an *OK*, and remains connected.
&D2 If DTR drops while in online data mode, the modem hangs up. If the signal is not present, the modem will not answer or dial.
&D3 If DTR drops, modem hangs up and resets as if **ATZ** command were issued.

Command: &E*n* **XON/XOFF Pacing Control**
Values: *n* = 12 or 13
Default: 12
Description:
&E12 Disables XON/XOFF pacing.
&E13 Enables XON/XOFF pacing.

Command: &F*n* **Load Factory Settings**
Values: *n* = 0
Default: None
Description:
&F0 Load factory settings as active configuration.
Note: See also the **Z** command.

Command: &G*n* **V.22bis Guard Tone Control**
Values: *n* = 0, 1, or 2
Default: 0
Description:
&G0 Disable guard tone.
&G1 Set guard tone to 550 Hz.
&G2 Set guard tone to 1800 Hz.
Note: The **&G** command is not used in North America.

Command: &K*n* **Flow Control Selection**
Values: *n* = 0, 3, or 4
Defaults: 3
Description:
&K0 Disable flow control.
&K3 Enable CTS/RTS hardware flow control.
&K4 Enable XON/XOFF software flow control.

Command: **&L*n*** **Leased Line Operation**
Values: *n* = 0, 1, or 2
Defaults: 0
Description:
&L0 The modem is set for standard dial-up operation.
&L1 The modem is set for leased line operation in originate mode.
&L2 The modem is set for leased line operation in answer mode.

Note: For **&L1** and **&L2**, there is a 30-second window between power up and the starting of the leased line handshake. During this time, you can turn off the command, if desired.

Command: **&P*n*** **Pulse Dial Make-to-Break Ratio Selection**
Values: *n* = 0, 1, or 2
Default: 0
Description:
&P0 60/40 make-to-break ratio
&P1 67/33 make-to-break ratio
&P2 20 pulses per second

Note: The **&P2** command is available only if the country/regional code is set to Japan.

Command: **&Q*n*** **Asynchronous Communications Mode**
Values: *n* = 0, 5, 6, 8, or 9
Default: 5
Description:
&Q0 Asynchronous with data buffering. Same as **\N0**.
&Q5 Error control with data buffering. Same as **\N3**.
&Q6 Asynchronous with data buffering. Same as **\N0**.
&Q8 MNP error control mode. If MNP error control is not established, the modem falls back according to the setting in **S36**.
&Q9 V.42 or MNP error control mode. If neither error control is established, the modem falls back according to the setting in **S36**.

Command: **&S*n*** **Data Set Ready (DSR) Control**
Values: *n* = 0 or 1
Default: 0
Description:
&S0 DSR is always ON.
&S1 DSR goes ON only during a connection.

Command: **&T*n*** **Loopback Test (V.54 Test) Commands**
Values: *n* = 0, 1, 3, 6
Default: None

Description: The modem can perform selected test and diagnostic functions. A test can be run only when the modem is operating in non-error-correction mode (normal or direct mode). For tests 3 and 6, a connection between the two modems must be established. To terminate a test in progress, the escape sequence (**+++AT**) must be entered.
&T0 Stops any test in progress.
&T1 Starts a local analog loopback, V.54 Loop 3, test. If a connection exists when this command is issued, the modem hangs up. When the test starts, a *CONNECT* message is displayed.
&T3 Starts local digital loopback, V.54 Loop 2, test. If no connection exists, *ERROR* is returned.
&T6 Initiates a remote digital loopback, V.54 Loop 2, test without self-test. If no connection exists, *ERROR* is returned.

Command: **&V** **Display Current Settings**
Values: N/A
Description: Displays the active modem settings.

Command: &W*n* **Store Current Configuration**

Values: *n* = 0 or 1

Default: 1

Description:

&W0 Stores current modem settings in non-volatile memory and causes them to be loaded at power-on or following the **ATZ** command instead of the factory defaults. See **&F** command.

&W1 Clears user default settings from non-volatile memory and causes the factory defaults to be loaded at power-on or following the **ATZ** command.

Command: &Zy=*x* **Store Dialing Command**

Values: *y* = 0–2 (0–1SMI-Parallel {internal})
x = Dialing command

Default: None

Description: Stores dialing command *x* in memory location *y*. Dial the stored number using the command **ATDS=y**. See Also the #CBS command, a callback security command.

Command: \A*n* **Select Maximum MNP Block Size**

Values: *n* = 0, 1, 2, or 3

Default: 3

Description:

\A0 64-character maximum
\A1 128-character maximum
\A2 192-character maximum
\A3 256-character maximum

Command: \B*n* **Transmit Break**

Values: *n* = 0–9 in 100 ms units

Default: 3

Description: In non-error-correction mode only, sends a break signal of the specified length to a remote modem. Works in conjunction with the ***\K*** command.

Command: **\K*n*** **Break Control**
Values: *n* = 0–5
Default: 5
Description: Controls the modem's response to a break received from: computer, remote modem, or **\B** command. Response is different for each of three different states.

Data mode. Modem receives the break from the computer:
\K0 Enter online command mode, no break sent to the remote modem.
\K1 Clear data buffers and send break to the remote modem.
\K2 Same as **\K0**.
\K3 Send break immediately to the remote modem.
\K4 Same as **\K0**.
\K5 Send break to the remote modem in sequence with the transmitted data.

Data mode. Modem receives the break from the remote modem:
\K0 Clear data buffers and send break to the computer.
\K1 Same as **\K0**.
\K2 Send break immediately to the computer.
\K3 Same as **\K2**.
\K4 Send break to the computer in sequence with the received data.
\K5 Same as **\K4**.

Online command mode. Modem receives a \Bn command from the computer:
\K0 Clear data buffers and send break to the remote modem.
\K1 Same as **\K0**.
\K2 Send break immediately to the remote modem.
\K3 Same as **\K2**.
\K4 Send break to the remote modem in sequence with the transmitted data.
\K5 Same as **\K4**.

Command: **\N*n*** **Error Correction Mode Selection**
Values: *n* = 0–5, or 7
Default: 3
Description:
\N0 Non-error correction mode with data buffering (buffer mode; same as **&Q6**).
\N1 Same as **N0**.
\N2 MNP reliable mode. If the modem cannot make an MNP connection, it disconnects.
\N3 V.42/MNP auto-reliable mode. The modem attempts first to connect in V.42 error correction mode, then in MNP mode, and finally in non-error correction (buffer) mode with continued operation.
\N4 V.42 reliable mode. If the modem cannot make a V.42 connection, it disconnects.
\N5 V.42, MNP, or non-error correction (same as **\ N3**).
\N7 V.42, MNP, or non-error correction (same as **\ N3**).

Command: **\Q*n*** **Flow Control Selection**
Values: n = 0, 1, or 3
Default: 3
Description:
\Q0 Disable flow control (same as **&K0**).
\Q1 XON/XOFF software flow control (same as **&K4**).
\Q2 CTS-only flow control. Not supported.
\Q3 RTS/CTS hardware flow control (same as **&K3**).

Command: **\Tn** **Inactivity Timer**
Values: n = 0, 1–255
Default: 0
Description: Sets the time (in minutes) after the last character is sent or received that the modem waits before disconnecting. A value of zero disables the timer. Applies only in buffer mode.

Note: You can also set the inactivity timer by changing the value of **S30**.

Command: **\Vn** **Protocol Result Code**
Values: n = 0, 1, or 2
Default: 1
Description:
\V0 Disables the appending of the protocol result code to the DCE speed.
\V1 Enables the appending of the protocol result code to the DCE speed.
\V2 Same as **\V1**.

Command: **\X*n*** **XON/XOFF Pass-Through**
Values: *n* = 0 or 1
Default: 0
Description: \X0 Modem responds to and discards XON/XOFF characters.
\X1 Modem responds to and passes XON/XOFF characters.
Note: This is also controlled via **&E6** and **&E7**.

Command: **-C*n*** **Data Calling Tone**
Values: *n* = 0 or 1
Defaults: 1
Description: -C0 Disable V.25 data calling tone to deny remote data/fax/voice discrimination.
-C1 Enable V.25 data calling tone to allow remote data/fax/voice discrimination.

Command: **%A** **Adaptive Answer Result Code Enable**
Values: *n* = 0 or 1
Default: 0
Description: The %A command controls whether the DATA or FAX result codes will be sent by the modem. The modem must be in fax mode for this command to work. Also, the modem must be set to **+FAA=1**, which enables the modem to distinguish between a fax and a data call. When these commands are enabled, the modem sends DATA to the computer when it detects data tones and FAX when it detects fax tones. These strings are used by some servers to select the appropriate communication program.
%A0 Disables adaptive answer result codes.
%A1 Enables adaptive answer result codes.

Command: **%B** **View Numbers in Blacklist**
Values: N/A
Description: If blacklisting is in effect, **AT%B** displays the numbers for which the last call attempted in the previous two hours failed. In countries that do not require blacklisting, the *ERROR* result code appears.

Command: **%C*n*** **Data Compression Control**
Values: *n* = 0 or 1
Default: 1
Description: %C0 Disable V.42bis/MNP 5 data compression.
%C1 Enable V.42bis/MNP 5 data compression.

Command: **%DC*n*** **AT Command Control**
Values: *n* = 0 or 1
Default: 0
Description: %DC0 The modem responds to AT commands.
%DC1 The modem ignores AT commands.
Note: The modem will respond to **AT%DC** for 10 seconds after power-up.

Command: **%E*n*** **Fallback and Fall Forward Control**
Values: *n* = 0, 1, or 2
Default: 2
Description: %E0 Disable fallback and fall forward.
%E1 Enable fallback, disable fall forward.
%E2 Enable fallback and fall forward.

Command: **%H*n*** **Direct Connect Enable**
Values: *n* = 0, 1
Default: 0
Description: %H0 Sets callback security to normal operation.
%H1 All callback security calls will be direct connect regardless of whether the password or phone number has the **-** character.

Command: **%R*n*** **Cisco Configuration**
Values: *n* = 0, 1
Default: 0
Description:
%R0 Disables Cisco configuration.
%R1 Sets **E0**, **Q1**, **&D0**, **\N0**, **$SB9600**, and **%S1** for operation with a Cisco router.

Command: **%S*n*** **Command Speed Response**
Values: *n* = 0, 1
Default: 0
Description:
%S0 Sets modem to respond to AT commands at all normal speeds.
%S1 AT commands accepted at 115200 bps only. Commands at other speeds are ignored.

Command: **$D*n*** **DTR Dialing**
Values: *n* = 0 or 1
Default: 0
Description:
$D0 Disables DTR dialing.
$D1 Dials the number in memory location 0 when DTR goes high.

Command: **$EB*n*** **Asynchronous Word Length**
Values: *n* = 0 or 1
Default: 0
Description:
$EB0 Enables 10-bit mode.
$EB1 Enables 11-bit mode.

Command: **$MB*n*** **Online BPS Speed**
Values: *n* = speed in bits per second
Default: 28,800
Description:
$MB75 Selects CCITT V.23 mode
$MB300 Selects 300 bps on-line
$MB1200 Selects 1200 bps on-line
$MB2400 Selects 2400 bps on-line
$MB4800 Selects 4800 bps on-line
$MB9600 Selects 9600 bps on-line
$MB14400 Selects 14400 bps on-line
$MB19200 Selects 19200 bps on-line
$MB28800 Selects 28800 bps on-line
$MB33600 Selects 33600 bps on-line

Command: **$RP*n*** **Ring Priority vs. AT Command Priority**
Values: *n* = 0 or 1
Default: 1
Description:
$RP0 The AT command will have priority over the ring. S1 will be reset to 0 if an AT command is received. This command is storable to memory.
$RP1 The ring will have priority over the AT command. S1 will increment even if an AT command and ring are received together and the incoming call will be answered when S1 is equal to S0.
Note: SocketModems do not detect ring cadence of TelTone telephone line simulators as a valid ring.

Command: **$SB*n*** **Serial Port Baud Rate**
Values: *n*= speed in bits per second
Default: 57600
Description:
$SB300 Sets serial port to 300 bps
$SB1200 Sets serial port to 1200 bps
$SB2400 Sets serial port to 2400 bps
$SB4800 Sets serial port to 4800 bps
$SB9600 Sets serial port to 9600 bps
$SB19200 Sets serial port to 19200 bps
$SB38400 Sets serial port to 38400 bps
$SB57600 Sets serial port to 57600 bps
$SB115200 Sets serial port to 115200 bps
$SB230400 Sets serial port to 230400 bps

Command: +VDR=x, y **Distinctive Ring Report**

Values: x = 0, 1 Distinctive Ring report control. See description.
y = 0–255 Minimum ring interval in 100 ms units. See description.

Default: 0, 0

Description: Enables reporting of ring cadence information to the DTE and specifies the minimum ring cadence that will be reported.

The report format is one line per silence period and one line per ring period. The length of the silence period is in the form DROF=number in units of 100 ms<CR><LF>, and the length of the ring is in the form DRON=number in units of 100 ms<CR> <LF>. The modem may produce a Ring event code after the DRON message if enabled by the y parameter. The y parameter must be set to a value equal to or smaller than the expected ring cadence in order to pass the report to the DTE.

+VDR=0, N/A	Disables Distinctive Ring cadence reporting.
+VDR=1, 0	Enables Distinctive Ring cadence reporting. Other call progress result codes (including RING) are reported as normal.
+VDR=1, >0	Enables Distinctive Ring cadence reporting. The RING result code is reported after the falling edge of the ring pulse (i.e., after the DRON report).
+VDR=?	Displays the allowed values.
+VDR?	Displays the current value.

Command: **#CBAn** **Callback Attempts**
Values: n = 1–255
Default: 4
Description: Sets the number of callback attempts that are allowed after passwords have been exchanged between modems.

Command: **#CBDn** **Callback Delay**
Values: n = 0–255
Default: 15
Description: Sets the length of time (in seconds) that the modem waits before calling back the remote modem.

Command: **#CBF?** **Callback Failed Attempts Display**
Values: N/A
Default: N/A
Description: Requests the number of failed callback passwords since reset or power-up. This number can be stored to nonvolatile memory using the **&W** command.

Command: **#CBFR** **Callback Failed Attempts Reset**
Values: N/A
Default: N/A
Description: Resets the number of failed callback passwords to 0. This does not reset the number stored in nonvolatile memory.

Command: **#CBIn** **Local Callback Inactivity Timer**
Values: n = 1–255
Default: 20
Description: Sets the time (in minutes) that the modem waits for a command before forcing the user to enter the setup password again.

Command: **#CBNy=x** **Store Callback Password**
Values: y = 0–29
x = password
Defaults: None
Description: Sets the callback security password for the y memory location. The password must have 6 to 10 characters, and cannot include the + or - characters.

Command: **#CBPn** **Callback Parity**
Values: n = 0, 1, or 2
Default: 0
Description: Sets parity for the callback security messages.
#CBP0 No parity.
#CBP1 Odd parity.
#CBP2 Even parity.

Command: **#CBRy** **Callback Security Reset**
Values: y = 0–29
Default: None
Description: Clears the password and phone number in the **y** memory location.

Command: **#CBSn** **Callback Enable/Disable**
Values: n = 0, 1, 2, or 3
Default: 0
Description:
#CBS0 Disables callback security.
#CBS1 Enables local and remote callback security.
#CBS2 Enables remote callback security only.
#CBS3 Disables callback security until local hang-up or reset.

Command: **#Pn** **Set 11-bit Parity**
Values: n = 0 or 1
Default: 2
Description:
#P0 No parity.
#P1 Odd parity.
#P2 Even parity.

Command: **#S*x*** **Enter Setup Password**
Values: *x*= password (1–8 characters, case sensitive)
Default: MTSMODEM
Description: Enters the remote configuration setup password.

Command: **#S=*x*** **Store Setup Password**
Values: *x*= password (1–8 characters, case sensitive)
Default: MTSMODEM
Description: Stores a new remote configuration setup password.

Escape AT Commands

Command: **+++AT<CR>** **Escape Sequence**
Values: N/A
Description: Puts the modem in command mode (and optionally issues a command) while remaining online. Type **+++AT** and up to six optional command characters; then press ENTER. Used mostly to issue the hang-up command: **+++ATH<CR>**.

Command: **%%%ATMTSMODEM<CR>** **Remote Configuration Escape Sequence**
Values: N/A
Description: Initiates remote configuration mode while online with remote modem. The remote configuration escape character (%) is defined in register **S13**.

V.92 Commands

Command: +MS= Modulation Selection
Values: See description.
Defaults: See description.
Description: This extended-format command selects modulation, enables or disables automode, and specifies the highest downstream and upstream connection rates using one to four subparameters.

The command syntax is
+MS=[mod][,[automode][,[0][,[max_rate][,[0][,[max_rx_rate]]]]]]<CR>
Subparameters that are not entered retain their current value. Commas separate optional subparameters, and must be inserted to skip a subparameter. Example: +MS=,0<CR> disables automode and keeps all other settings at their current values.

+MS=? Reports supported options in the format (list of supported mod values),(list of supported automode values),(0),(list of supported max_rate values),(0),(list of supported max_rx_rate values). Example: +MS: (BELL103, V21, BELL212A, V22, V22B, V23C, V32, V32B, V34, V90, V92), (0, 1), (0), (0-33600), (0), (0-56000)

+MS? Reports current options in the format mod, automode, 0, max_rate, 0, max_rx_rate. Example: +MS: V92, 1, 0, 31200, 0, 56000.

Subparameters

mod Specifies the preferred modulation (automode enabled) or the modulation to use in originating or answering a connection (automode disabled). The default is V92.

mod	**Modulation**	**Possible rates (bps)[1]**
V92[2]	V92	56000, 54666, 53333, 52000, 50666, 49333, 48000, 46666, 45333, 44000, 42666, 41333. 40000, 38666, 37333, 36000, 34666, 33333, 32000, 30666, 29333, or 28000
V903	V.90	56000, 54666, 53333, 52000, 50666, 49333, 48000, 46666, 45333, 44000, 42666, 41333. 40000, 38666, 37333, 36000, 34666, 33333, 32000, 30666, 29333, or 28000
V34	V.34	33600, 31200, 28800, 26400, 24000, 21600,19200, 16800, 14400, 12000, 9600, 7200, 4800, or 2400
V32B	V.32bis	14400, 12000, 9600, 7200, or 4800
V32	V.32	9600 or 4800
V22B	V.22bis	2400 or 1200
V22	V.22	1200
V23C	V.23	1200
V21	V.21	300
Bell212A	Bell 212A	1200
Bell103	Bell 103	300

Notes:

1. See optional <*automode*>, <*max_rate*>, and <*max_RX_rate*> subparameters.
2. Selects V.92 modulation as first priority. If a V.92 connection cannot be established, the modem attempts V.90, V.34, V.32bis, etc.
3. Selects V.90 modulation as first priority. If a V.90 connection cannot be established, the modem attempts V.34, V.32bis, etc.

automode An optional numeric value that enables or disables automatic modulation negotiation using V.8 bis/V.8 or V.32 bis Annex A. Automode is disabled if values are specified for the max_rate and max_rx_rate parameters. The options are:

0 Disable automode
1 Enable automode (default)

max_rate An optional number that specifies the highest rate at which the modem may establish an upstream (transmit) connection. The value is decimal coded in units of bps, for example, 33600 specifies the highest rate to be 33600 bps.

0 Maximum rate determined by the modulation selected in mod (default).

300–33600 Maximum rate value limited by the modulation selected in mod. For valid max_rate values for each mod value, see the following table.

***mod* value**	**Valid *max_rate* values (bps)**
V92, V90, V34	31200, 28800, 26400, 24000, 21600,19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400
V32B	19200, 16800, 14400, 12000, 9600, 7200, 4800
V32	14400, 12000, 9600, 7200, 4800
V22B	2400
V22, V23C, Bell212A	1200
V21, Bell103	300

max_rx_rate An optional number that specifies the highest rate at which the modem may establish a downstream (receive) connection. The value is decimal coded in units of bps, e.g., 28800 specifies the highest rate to be 28800 bps.

0 Maximum rate determined by the modulation selected in ***mod*** (default).

300–56000 Maximum rate value limited by the modulation selected in *mod*. See “Possible rates” in the *mod* table.

Command: +PCW=n **Call Waiting Enable**
Values: n = 0, 1, or 2
Default: 2
Description: Controls the action to be taken upon detection of a call waiting tone in V.92 mode. Values specified by this command are not modified when an **AT&F** command is issued.

+PCW=0	Toggles V.24 Circuit 125 and collects Caller ID if enabled by +VCID
+PCW=1	Hangs up
+PCW=2	Ignores V.92 call waiting
+PCW=?	Displays the allowed values
+PCW?	Displays the current value

Command: +PIG=n **PCM Upstream Ignore**
Values: n = 0 or 1
Default: 1
Description: Controls the use of PCM upstream during V.92 operation. PCM upstream allows faster upload speeds to a V.92 server.

+PIG=0	Disables PCM upstream
+PIG=1	Enables PCM upstream
+PIG=?	Displays the allowed values
+PIG?	Displays the current value

Command: +PMH=n **Modem on Hold Enable**
Values: n = 0 or 1
Default: 1
Description: Controls if modem on hold procedures are enabled during V.92 operation. Normally controlled by a modem on hold program. Values specified by this command are not modified when an **AT&F** command is issued.

+PMH=0	Enables V.92 modem on hold
+PMH=1	Disables V.92 modem on hold
+PMH=?	Displays the allowed values
+PMH?	Displays the current value

Command: **+PMHF** **V.92 Modem Hook Flash**
Values: N/A
Default: N/A
Description: Causes the DCE to go on-hook for a specified period of time, and then return off-hook for at least a specified period of time. The specified period of time is normally one-half second, but may be governed by national regulations.

Command: **+PQC=n** **Quick Connect Control**
Values: n = 0, 1, 2, or 3
Default: 3
Description: Controls V.92 shortened Phase 1 and Phase 2 startup procedures (Quick Connect). When line conditions are stable, quick connect results in shortened connect times; however, significant fluctuation in line conditions from call to call can cause longer connect times; thus, it may be advisable to disable quick connect.

+PQC=0	Enables Short Phase 1 and Short Phase 2 (Quick Connect)
+PQC=1	Enables Short Phase 1
+PQC=2	Enables Short Phase 2
+PQC=3	Disables Short Phase 1 and Short Phase 2
+PQC=?	Displays the allowed values
+PQC?	Displays the current value

Command: **+VCID=n** **Caller ID Selection**
Values: n = 0, 1, or 2
Default: 0
Description: Enables Caller ID detection and configures the reporting and presentation of the Caller ID data that is detected after the first ring. The reported data includes the date and time of the call, the caller's name and number, and a message. Set S0=2.

+VCID=0	Disables Caller ID
+VCID=1	Enables Caller ID with formatted data
+VCID=2	Enables Caller ID with unformatted data
+VCID=?	Displays the allowed values
+VCID?	Displays the current value

Command: **+VDR=x, y** **Distinctive Ring Report**
Values: x = 0, 1 Distinctive Ring report control. See description.
y = 0–255 Minimum ring interval in 100 ms units. See description.
Default: 0, 0
Description: Enables reporting of ring cadence information to the DTE and specifies the minimum ring cadence that will be reported.
Report format is one line per silence period and one line per ring period. The length of the silence period is in the form DROF=number in units of 100 ms<CR><LF>, and the length of the ring is in the form DRON=number in units of 100 ms<CR> <LF>. The modem may produce a Ring event code after the DRON message if enabled by the y parameter. The *y* parameter must be set to a value equal to or smaller than the expected ring cadence in order to pass the report to the DTE.

+VDR=0, N/A	Disables Distinctive Ring cadence reporting.
+VDR=1, 0	Enables Distinctive Ring cadence reporting. Other call progress result codes (including RING) are reported as normal.
+VDR=1, >0	Enables Distinctive Ring cadence reporting. RING result code is reported after falling edge of the ring pulse (after the DRON report).
+VDR=?	Displays the allowed values.
+VDR?	Displays the current value.

Command: **#CBAn** **Callback Attempts**
Values: n = 1–255
Default: 4
Description: Sets the number of callback attempts that are allowed after passwords have been exchanged between modems.

Command: **#CBDn** **Callback Delay**
Values: n = 0–255
Default: 15
Description: Sets the length of time (in seconds) that the modem waits before calling back the remote modem.

Command: **#CBF?** **Callback Failed Attempts Display**
Values: N/A
Default: N/A
Description: Requests the number of failed callback passwords since reset or power-up. This number can be stored to nonvolatile memory using the &W command.

Command: **#CBFR** **Callback Failed Attempts Reset**
Values: N/A
Default: N/A
Description: Resets the number of failed callback passwords to 0. This does not reset the number stored in nonvolatile memory.

Command: **#CBIn** **Local Callback Inactivity Timer**
Values: n = 1–255
Default: 20
Description: Sets the time (in minutes) that the modem waits for a command before forcing the user to enter the setup password again.

Command: **#CBNy=x** **Store Callback Password**
Values: y = 0–29
x = password
Defaults: None
Description: Sets the callback security password for the y memory location. The password must have 6 to 10 characters, and cannot include the + or - characters.

Command: **#CBPn** **Callback Parity**
Values: n = 0, 1, or 2
Default: 0
Description: Sets parity for the callback security messages.
#CBP0 No parity.
#CBP1 Odd parity.
#CBP2 Even parity.

Command: **#CBRy** **Callback Security Reset**
Values: y = 0–29
Default: None
Description: Clears the password and phone number in the y memory location.

Command: **#CBSn** **Callback Enable/Disable**
Values: n = 0, 1, 2, or 3
Default: 0
Description:
#CBS0 Disables callback security.
#CBS1 Enables local and remote callback security.
#CBS2 Enables remote callback security only.
#CBS3 Disables callback security until local hang-up or reset.

Command: **#Pn** **Set 11-bit Parity**
Values: n = 0 or 1
Default: 2
Description:
#P0 No parity.
#P1 Odd parity.
#P2 Even parity.

Command: **#Sx** **Enter Setup Password**
Values: x= password (1–8 characters, case sensitive)
Default: MTSMODEM
Description: Enters the callback security setup password.

Command: **#S=x** **Store Setup Password**
Values: x= password (1–8 characters, case sensitive)
Default: MTSMODEM
Description: Stores a new callback security and remote configuration setup password.

S-Registers

Certain modem values, or parameters, are stored in memory locations called S-Registers. Use the **S** command to read or to alter the contents of S-Registers (see previous section).

Register	Unit	Range	Default	Description
S0	1 ring	0, 1–255	1	Sets the number of rings until the modem answers. ATS0=0 disables auto answer completely.
S1	1 ring	0–255	0	Counts the rings that have occurred.
S2	decimal	0–127 128–255	43 (+)	Sets ASCII code for the escape sequence character. Values greater than 127 disable escape.
S3	decimal	0–127	13 (^M)	Sets the ASCII code for the carriage return character.
S4	decimal	0–127	10 (^J)	Sets the ASCII code for the line feed character.
S5	decimal	0–32 33–127	8 (^H)	Sets the ASCII code for the backspace character. Values greater than 32 disable backspace.
S6	seconds	2–65*	2*	Sets the time the modem waits after it goes off-hook before it begins to dial the telephone number.
S7	seconds	35-65*	50*	Sets the time the modem waits for a carrier signal before aborting a call. Also sets the wait for silence time for the @ dial modifier.
S8	seconds	0–65	2	Sets the length of a pause caused by a comma character in a dialing command.
S9	decimal	0, 1–127	37 (%)	Sets ASCII code for remote configuration escape character. **S9=0** disables remote configuration.
S10	100 ms	1–254	20	Sets how long a carrier signal must be lost before the modem disconnects.
S11	1 ms	50–150*	95*	Sets spacing and duration of dialing tones.
S28	decimal	0, 1–255	1	0 disables, 1–255 enables V.34 modulation.
S30	1 minute	0, 1–255	0	Sets the length of time that the modem waits before disconnecting when no data is sent or received. A value of zero disables the timer. See also the **\T** command
S35	decimal	0–1	1	0 disables, 1 enables the V.25 calling tone, which allows remote data/fax/voice discrimination.
S36	decimal	0–7	7	Specifies the action to take in the event of a negotiation failure when error control is selected. (See **S48**.)

S37	decimal	0–19	0	Sets the maximum V.34 “upstream” speed at which the modem attempts to connect. 0 = maximum speed 1 = reserved 2 = 1200/75 bps 3 = 300 bps 4 = reserved 5 = 1200 bps 6 = 2400 bps 7 = 4800 bps 8 = 7200 bps 9 = 9600 bps 10 = 12000 bps 11 = 14400 bps 12 = 16800 bps 13 = 19200 bps 14 = 21600 bps 15 = 24000 bps 16 = 26400 bps 17 = 28800 bps 18 = 31200 bps 19 = 33600 bps
S38	decimal	0–23	1	Sets “downstream” data rate where V.90 provides rates of 28,000 to 56,000 bps in increments of 1,333 bps. 0 = V.90 disabled 1 = V.90 auto rate 2 = 28,000 bps 3 = 29,333 bps 4 = 30,666 bps 5 = 32,000 bps 6 = 33,333 bps 7 = 34,666 bps 8 = 36,000 bps 9 = 37,333 bps 10 = 38,666 bps 11 = 40,000 bps 12 = 41,333 bps 13 = 42,666 bps 14 = 44,000 bps 15 = 45,333 bps 16 = 46,666 bps 17 = 48,000 bps 18 = 49,333 bps 19 = 50,666 bps 20 = 52,000 bps 21 = 53,333 bps 22 = 54,666 bps 23 = 56,000 bps **Upstream data rates:** Upstream V.90 data rates are 4800 to 33,600 bps in 2400 bps increments.
S43	decimal	0–1	1	For testing and debugging only. Enables/disables V.32bis start-up auto mode operation. 0 = disable; 1 = enable.

S48 decimal 7 or 128 7

Enables (7) or disables (128) LAPM negotiation. The following table lists the **S36** and **S48** configuration settings for certain types of connections.

	S48=7	**S48=128**
S36=0, 2	LAPM or hang up	Do not use
S36=1, 3	LAPM or async	Async
S36=4, 6	LAPM, MNP, or hang up	MNP or hang up
S36=5, 7	LAPM, MNP, or async	MNP or async

S89 seconds 0, 5–255 10

Sets the length of time in the off-line command mode before the modem goes into standby mode or “sleep mode”. A value of zero prevents standby mode; a value of 1–4 sets the value to 5. Standby mode (sleep mode or low power mode) is controlled by **S89**. It programs the number of seconds of inactivity before the modem will go to sleep. The default value is 0. A value of 0 disables standby mode. The modem will wake on an incoming ring or an AT command.

S108 decimal 0–3, 6, 7 6

Selects the 56K digital loss if using the modem through a PBX line. The default value is -6 dB loss, the value used when calling from a typical POTS line long distance.

0 = -0 dB digital loss, no robbed-bit signaling
1 = -3 dB PBX digital loss
2 = -2 dB digital loss
3 = -3 dB digital loss
6 = -6 dB digital loss
7 = -0 dB digital loss with robbed-bit signaling

Result Codes

In command mode your modem can send responses called **Result Codes** to your computer. Result codes are used by communications programs and can also appear on your monitor.

Terse	Verbose	Description
0	OK	Command executed
1	CONNECT	Modem connected to line
2	RING	Ring signal detected
3	NO CARRIER	Carrier signal lost or not detected
4	ERROR	Invalid command
5 *	CONNECT 1200	Connected at 1200 bps
6	NO DIALTONE	No dial tone detected
7	BUSY	Busy signal detected
8	NO ANSWER	No answer at remote end
9	CONNECT 75	Connected at 75 bps
10*	CONNECT 2400	Connected at 2400 bps
11*	CONNECT 4800	Connected at 4800 bps
12*	CONNECT 9600	Connected at 9600 bps
13*	CONNECT 14400	Connected at 14400 bps
14*	CONNECT 19200	Connected at 19200 bps
18	CONNECT 57600	Connected at 57600 bps
24*	CONNECT 7200	Connected at 7200 bps
25*	CONNECT 12000	Connected at 12000 bps
28	CONNECT 38400	Connected at 38400 bps
40*	CONNECT 300	Connected at 300 bps
55*	CONNECT 21600	Connected at 21600 bps
56*	CONNECT 24000	Connected at 24000 bps
57*	CONNECT 26400	Connected at 26400 bps
58*	CONNECT 28800	Connected at 28800 bps
59*	CONNECT 31200	Connected at 31200 bps
60*	CONNECT 33600	Connected at 33600 bps
70	CONNECT 32000	Connected at 32000 bps
71	CONNECT 34000	Connected at 34000 bps
72	CONNECT 36000	Connected at 36000 bps
73	CONNECT 38000	Connected at 38000 bps
74	CONNECT 40000	Connected at 40000 bps
75	CONNECT 42000	Connected at 42000 bps
76	CONNECT 44000	Connected at 44000 bps
77	CONNECT 46000	Connected at 46000 bps
78	CONNECT 48000	Connected at 48000 bps
79	CONNECT 50000	Connected at 50000 bps
80	CONNECT 52000	Connected at 52000 bps
81	CONNECT 54000	Connected at 54000 bps
82	CONNECT 56000	Connected at 56000 bps
83	CONNECT 58000	Connected at 58000 bps
84	CONNECT 60000	Connected at 60000 bps
86	CONNECT 16800	Connected at 16800 bps
87	CONNECT 115200	Connected at 115200 bps
88	DELAYED	Delay is in effect for the dialed number
89	BLACKLISTED	Dialed number is blacklisted
90	BLACKLIST FULL	Blacklist is full
91	CONNECT 230400	Connected at 230400 bps
100	CONNECT 28000	Connected at 28000 bps
101	CONNECT 29333	Connected at 29333 bps
102	CONNECT 30666	Connected at 30666 bps
103	CONNECT 33333	Connected at 33333 bps
104	CONNECT 34666	Connected at 34666 bps
105	CONNECT 37333	Connected at 37333 bps
106	CONNECT 38666	Connected at 38666 bps
107	CONNECT 41333	Connected at 41333 bps
108	CONNECT 42666	Connected at 42666 bps
109	CONNECT 45333	Connected at 45333 bps
110	CONNECT 46666	Connected at 46666 bps
111	CONNECT 49333	Connected at 49333 bps
112	CONNECT 50666	Connected at 50666 bps
113	CONNECT 53333	Connected at 53333 bps

114	CONNECT 54666	Connected at 54666 bps
115	CONNECT 25333	Connected at 25333 bps
116	CONNECT 26666	Connected at 26666 bps

*EC is added to these result codes when the extended result codes configuration option is enabled. EC is replaced by one of the following codes, depending on the type of error control connection:

V42bis – V.42 error control (LAP-M) and V.42bis data compression
V42 – V.42 error control (LAP-M) only
MNP5 – MNP 4 error control and MNP 5 data compression
MNP4 – MNP 4 error control only
NoEC – No error control protocol).

Appendix G - License Agreement

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